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NOVEMBER
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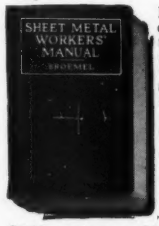

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PEXTO

SHEET METAL WORKERS' MACHINES & TOOLS

INDUSTRIAL-ARTS MAGAZINE

Vol. VIII NOVEMBER, 1919 No. 11

FIRST AID TO THE INEXPERIENCED—III

CLASS MANAGEMENT, OR HOW TO HANDLE THE BOYS

S. J. Vaughn, De Kalb, Ill.

THE government of a group by an individual is not a one-man affair by any means, as certain individuals in Europe have abundant occasion to know. It's a cooperative enterprise; and he who undertakes it on any other basis will have cause to regret.

In the management of a group or class, there are two conflicting principles in operation. One is the compulsion of unwilling obedience by external authority. The other is the accomplishment of willing obedience by inducing a wholesome and compelling desire. The one uses as its instruments, force and mandate. The other depends upon intimate understanding and cooperation and the sense of justice. The one is the government of the monarch. The other is the government of the group through guidance. Under the one, goaded by the lash of the driver, the group suffers repression, dependence, and mental and moral atrophy. Under the other, the group achieves mental and moral happiness, strength, initiative, and independence, thru leadership.

As was indicated in the first article of the series in the September issue, if a teacher is successful in establishing himself in the respect and confidence of his pupils at the very first meeting, he will have done much to obviate any difficulties that may later arise.

In management as in other things, a principle laid down in a previous article is a pretty safe one, "Meet your class with a proposition". And a good general rule to follow this with is to make the proposition in immediate connection with the problem as it arises for solution.

In the first place, a teacher should have in mind some fundamental notions of what constitutes good shop conduct, and at least a tentative conviction concerning the various questions of management and procedure that will inevitably arise very early in the work, most of them in the first lesson or two. The proper settlement of the seemingly small matters of routine is of great importance.

The following questions call for early and wise decision:

1. How shall the pupils enter and leave the shop? Shall the boys form in line, mark time, march, and keep step, or shall they enter and leave quietly, orderly, and naturally without that formality?

2. Shall the boys be permitted to talk to each other during their work?

3. Shall the teacher go to the boys' benches to confer with them and inspect their work, or shall the boys take their work and their questions, etc., to the teacher's desk?

4. Shall the boys feel free to move about over the room for the purpose of talking with other pupils, getting additional material or tools, getting a drink of water, etc., without specific permission from the teacher?

5. When shall the boys rest? Shall there be a rest period, or shall each pupil rest when he feels in need of it?

6. Is it ever permissible or desirable for pupils to help each other?

Various teachers have different methods of accomplishing the same end. Hence, these questions will be answered differently by different people, depending somewhat upon their training, their personal dispositions, and their familiarity with the classes for whom the questions are to be decided. But whatever the answers, they must all rest upon the following considerations:

1. Influence on the boys of a systematized and businesslike method of work.

2. Economy of time and facility in getting the work done.

3. The maintenance of a kindly feeling between the teacher and the pupils.

For whatever benefit they may be, I give below my own answers to the six questions suggested.

1. The pupils should enter and leave the shop quietly, orderly, and naturally without the formality of the line of march. The purpose is to do away with as much of the artificiality and formality as possible not essential to the proper conduct and work of the class. There is something in the very atmosphere of America that rebels against useless artificial restraint. There is something irritating in the very appearance of formal requirement. Perhaps the greatest thing ever done for the morale of certain boys' reformatories was to remove the bars from the windows. They proved to be artificial and much less effectual restraints than the absence of them with the accompanying assurance of confidence and respect.

2. After a long experiment with both methods, I am convinced that it is wise to permit a reasonable amount of quiet conversation between boys working at adjacent benches. I should not announce such a decision at the beginning of the work. I should *assume*

the propriety of it, and make such corrections and announcements as experience with the class made it seem advisable. Undoubtedly such conversations will at times interfere with pupils' work. However, on the whole, this difficulty is more easily dealt with and interferes less with the work than would be true of the difficulties arising out of the absence of such privileges.

3. The teacher should in practically all cases, go to the pupil's desk for consultation or for inspection of the pupil's work. There is scarcely anything more confusing than the constant running of the pupils to the teacher's desk or standing about it waiting their turns for conference and inspection. Besides, the teacher should inspect the boy's work at the bench, so that advice and direction concerning tool usage may be given in the most effective way at the pupil's bench with the pupil's tools.

4. Boys should not be leaving their benches for any purpose without the specific permission or direction of the teacher.

5. In the case of a ninety minute period of work, it is a very satisfactory plan to have a short rest period for all at the end of about sixty minutes. Rests by individual pupils should be permitted when needed.

6. It is very frequently both permissible and desirable for boys to help each other. They learn from each other in discussing and working together on problems of a common interest, and they develop a greater enthusiasm and a finer spirit. But such cooperation should be arranged with the teacher.

What I mean by government by reason, proposition, and conference may be illustrated by the method of handling the question as to whether the boys shall be running about over the shop at will. Personally, I want my pupils of the seventh and eighth grades to remain at their respective benches until they have my permission to leave. However, I do not lay down a rule to that effect at the first meeting of the class. I put the class to work. After a time, I observe that certain pupils begin to leave their benches for one purpose or another. I simply call the attention of the class and remark that I see there is going to be confusion unless we have some kind of an understanding about the matter of leaving benches and going about the room at will. I try to make the class feel that I don't want to make a ruling that will hamper them in their work or interfere with their comfort, but that *in the interest of both,* I want to have an understanding. I have even asked the pupils to suggest a solution. I ask the boys what they think would happen, if all of them should decide at the same time to lay down their tools and go roaming about over the shop. They answer that they would make a great disturbance, get in each other's way, and interfere with one another's work. I ask them what they would think of a factory where the workers went scampering about indiscriminately thru all departments, and they answer, *"Not much!"* Then I say something like the following: "How would it do for each fellow to let me know if it becomes necessary to leave his place of work? He could speak to me, raise his hand, give me a nod, or 'send me a wireless', and I could answer in the same manner. Then I should always be in control, the boys would not get in each other's way, and the work would go along much more rapidly and much more orderly. How would that suit?" The reply invariably is "Sure! We'll do it." I say, "All right. That's your rule, not mine."

This seems to me to be a fair, straight-forward, "man-to-man" method which rests upon the fundamental considerations of economy of time, lack of confusion, and businesslike management, and which has no suggestion of arbitrary restraint such as the announcement of an order or rule would have. The difference is psychological. The boys know the teacher has the authority, and the fact that he doesn't use it is interpreted by them as meaning that the teacher is a "good fellow" and that he wants to be "square" with them.

At this point someone usually suggests that I seem to be trying to avoid trouble. Yes, indeed, I want to avoid every bit of trouble I possibly can. There's plenty of unavoidable trouble that I have to meet in an uncompromising way. But there is another consideration, and that is that I want the boys to feel that we are all working together for a common purpose and that I am always willing to take them into my confidence and discuss with them the best ways and means of getting the big job done.

Teachers have remarked that they wanted the boys to "understand who's boss" and to respect authority. Well, they always understand who's boss. The attitude of the teacher determines that. And the best way to have authority respected is to make authority respectable. One doesn't have to show one's teeth and act like an enemy of the race to beget respect for authority. People often *heed* authority without respecting it. I am much happier to know that my authority is *genuinely respected* and my requests *happily obeyed when I'm out of the room,* than to know that the boys are mute and trembling in the presence of my authority and are openly disrespectful and defiant when my back is turned. And I know that either condition can be created.

Now one of the first questions asked me by the hundreds of superintendents and supervisors who are seeking teachers is, "Can the applicant get along with the boys?" If I say "yes", then they make further inquiries concerning other qualifications. But if the answer is negative, they invariably do not care to discuss other qualifications. They have discovered what some teachers seem not yet willing to admit, namely, that no matter how fine your theories, how wonderful your training, or how marvelous your technical skill, you can make absolutely no progress as a teacher of boys, unless you can "get along" with them—unless you can

establish with them a basis of goodfellowship and common understanding, so that they regard your respect as their law and your wish as their pleasure.

It must not be assumed that the ideal here set up is to be attained by simply catering to every whim and fleeting impulse of the boys. *Teaching is influencing.* A skillful teacher can compel a pupil to do certain tasks, to think certain thoughts, and to assume certain attitudes by the sheer force of logic, common interest, and cooperation, much more surely and effectually than he can by the artificial force of rule and rod. That's what is meant by the power of personality and leadership. There are teachers so skillful that they could inspire boys with a consuming interest for a considerable time in stringing beads, counting pebbles, or peeling potatoes. It's *influence* that counts. And the strange part about such influence is that under it's spell, the boys are not conscious that they are being literally led wherever the teacher wants them to go, while they have a kind of general feeling that they are doing as they please. This kind of influence is always much more wholesome and powerful, when it is reinforced by the natural interests, aptitudes, and desires of the boys, and when it is turned toward the accomplishment of ends that are in themselves significant to the class.

Of course, a strong and attractive personality is not the only requisite of a good disciplinarian. There are at least two other requirements. He must be able to organize the subject matter of his work to meet the needs of his classes and to make possible the proper presentation of it. And he must likewise be able to present the matter in a skillful and attractive manner. No matter how attractive one's personality or how strong his influence, the time comes very soon when it becomes necessary to back up such personality and influence with real, vital tasks which the teacher himself is able skillfully to execute and as skillfully to teach. The unprepared and unskilled teacher who undertakes, by virtue of his personality alone, to make a success of teaching will soon discover that pupils are not to be deceived. And when once his deficiencies are found out his influence is very largely lost.

The difficulty is that neither teacher nor pupil always "runs true to form." No matter how hard we work nor how conscientiously we try, there come fatal "off-days" when the boys are restless, noisy, inconsiderate, and mischievous, and when our theory, our judgment, our skill, our digestion, or something else fails and we crash suddenly into an "open switch" and trouble begins.

When trouble arises it is usually due to misunderstandings, unwise methods of criticism, unwise demands, poor judgment in matters of privilege, disagreements over selection and construction of projects, disagreements among the boys, and unprovoked impertinence and insolence on the part of a certain type of boy. The following are actual cases that have come under my own observation. Some of them, in fact, are my own blunders.

1. An eighth grade boy was doing a rather poor piece of woodworking. He seemed to be doing about as well as he could, but manifested an indifferent sort of attitude. When the teacher discussed the matter with him, he simply gave a kind of leery grin, blinked his eyes, and said nothing. At a later time, the teacher was discussing the same matter with him and remarked how disappointed he was with him. The boy kept looking about at the other boys with his leery grin and blinking eyes. The teacher, thinking that he was simply ridiculing his efforts and was winking at the other boys to emphasize his disregard, took the boy seriously to task about the matter, sent him from the room, and had a session with the principal for his benefit. In the course of the meeting with the principal, the boy said he didn't wink at the other boys—"didn't see no other boys". "What do you mean by saying you didn't see the other boys?" demanded the teacher. "Well", said the boy, "I've been havin' a little trouble with my eyes".

On examination, the poor fellow proved to have extraordinarily poor eyesight. He was fitted with glasses and did splendid work afterward. The teacher apologized both to him and to the class and won his everlasting friendship. Score another point for the physical examination of all pupils.

2. A seventh grade boy was making a little tool box. He had just nailed the sides and ends together when the teacher discovered that at one corner the nailing had been improperly done. On discovering this, the teacher said, "That's *wrong*. You'll have to knock it apart and do it over." At this, the highly nervous and irritable boy attacked the box with a mallet in such vigorous fashion as to create a sudden uproar, his sobs and tears and maledictions adding to the confusion. The supervisor, who was in an adjoining office, came in and found the teacher standing aghast, not knowing what to do. The boy stopped when he saw the supervisor approaching. "What's the trouble?" quietly inquired the supervisor. "Well, he told me to knock it to pieces, an' I'm doin' it," sobbed the irate youth, and then added, "said it was crooked!"

The class, interrupted by the hubbub, were standing watching the proceedings. "Well, boys," said the supervisor, "guess you had better go right on with your work," nodding to the teacher at the same time to go ahead with the work of the rest of the class.

After a little while, the supervisor said, while examining the box, "That corner *is* a little crooked, isn't it?" "Yes," said the boy sullenly. "Of course," commented the supervisor, "the lid *could* be cut down to fit the crooked box, I suppose." "I don't want no crooked box," replied the boy. "It would be a very easy matter to fix it," added the supervisor, and placing a block of wood inside the board that needed to be removed, he tapped it lightly with the hammer and the nails began to loosen their hold. "That's the way *I'd*

do it," said he and laid the hammer down and started across the shop inspecting the other boys' work as he went. In a little while, he was not surprised to hear light hammer blows and he knew that the box was on its way to recovery.

While the supervisor never looked in the direction of the boy and the box, he could nevertheless hear the steady blows in that vicinity. Some time later, when he had made the rounds of the class, he found himself near the seat of trouble. To his surprise this time, he found that the boy had not only straightened the crooked corner, but had nailed the bottom on the box perfectly. "Well, what do you think now?" asked the supervisor. "Huh!" said the boy, looking down rather sheepishly, "I always was kind o' hot headed. Betche I never do that again!"

"Why?" inquired the supervisor.

"'Cause him and you didn't fly off and act the fool like I did."

"What are you going to do now to straighten this matter out? Do you think you can straighten the rest of it as well as you did the box?" The boy didn't reply, but pretty soon he was seen talking earnestly to the teacher. No one knew what was said, but presently the teacher called the attention of the class and announced that James had something to say. In a kind of halting fashion, he volunteered an apology both to the teacher and to the class. He had lost the respect of his fellows and had won it back again completely.

The teacher simply erred in making an abrupt criticism that angered this highly nervous and "hot headed" boy. He knew immediately that he had erred and probably could have handled the situation without the aid of the supervisor.

With another type of boy, this method would have failed and much more vigorous and less mild means would have been necessary. Which means that the teacher must *understand the individual.*

3. An instance of unwise demands concerning inconsequential matters, is the case where the teacher announced that at the rest period the boys might go out to the playground. Since it was threatening rain, the teacher told the boys to wear their hats. A large eighth grade boy was observed going out without his hat. The teacher created quite a scene by taking the boy by the collar and pulling him vigorously back into the room, meanwhile delivering a heated lecture to the effect that "when I tell you to do a thing, I expect to be obeyed. I am the boss, etc., etc."

It so happened that this boy came to school without his hat, as was his custom. His explanations were without avail and the teacher and principal insisted that he make an apology before the class. His "apology" consisted of a statement to the effect that he was not conscious of any wrong-doing and that he was sorry "*if* he had done wrong". This was not satisfactory to the teacher and principal and he was expelled.

To save the boy, another manual training teacher interceded and asked to have him transferred to full time work in his shop. Finally the superintendent decided that he might spend half of each day in the shop and the other half in his regular eighth grade work. He finished all the eighth grade work by the end of the year with a much higher record than he had ever made before, altho he devoted half his time to shop work.

There was nothing wrong with the boy. The teacher was simply too prone to give orders, and his theory was that once an order is given, it cannot be recalled and must be obeyed. The wiser plan all the way thru would have been to *suggest* that the boys wear their hats, or that "the rainy weather might make it advisable." But even as it was, how much better it would have been to ask the young man, (for he was nearly six feet tall), for an explanation and simply to have passed the matter as of no consequence. But the teacher's defense was that "his dignity and his authority had to be maintained!" Well, I used to think pretty well of myself and my 'dignity', too, but the older I get and the more intimately I know myself, the less reason I see for it. I am never willing to put my 'dignity' against the welfare of any boy. And I certainly would never try to maintain my authority by driving boys out of school over matters of slight consequence. My own opinion is that this particular teacher *owed the boy an apology,* and if I had been in his situation, I should never have been happy until I had made it.

It is an extremely wise plan to make but very few unequivocal, iron-clad rules. The successful teacher will likewise scrupuously avoid precipitating serious crises over any matters except those of primary importance, and then only when he is sure of his grounds and his justification. And the way to do this is *first* to be sure of the facts and the justification and then to make the decision. Under such conditions, the teacher is justified in going to the very limit of his power and his authority under the law to maintain the right and to secure proper discipline.

4. A case of poor judgment and misdirected zeal that resulted in loss of interest, respect, and time, was provoked by the arrival of the circus. The parade with its blare of trumpets, its boy-fascinating caliope, and its dazzling array of clowns, animals, and huge, mysterious wagons, passed by the school building. The over-conscientious schoolmaster steadfastly insisted that the boys should remain at their benches and continue their work in spite of the hilarity and confusion just outside the door. They were not even permitted the joyous privilege of peeping out of the window.

This needs no comment. It seems to me to be an extreme example of that self-defeating zeal sometimes found among "old maid" school teachers of the masculine gender. Whatever else I may have been guilty of, *this* was not my blunder. I should have led the class to the curb among the struggling, balloon-waving crowd, and longed with the rest of the boys even for the privi-

lege of carrying water to the elephant. Then when the last vestige of the thrilling spectacle had disappeared from our straining eyes, I should have led my little flock reluctantly back to the shop and capitalized their enthusiasm and their delight by getting the best day's work out of them that they had ever done.

5. Unfortunately, there are cases of uncalled for and unprovoked insolence and impertinence on the part of the "smart Alec" and the bully. These are the severest challenge of one's skill, self-respect, determination, and courage. The case here cited is one where the new teacher was meeting his first eighth grade class in a considerable city. The class came in roughly and boisterously without even a glance at the new teacher. He tried to engage them in conversation and find some kind of basis for a pleasant relationship. They seemed decidedly more interested in "rough-housing" than in anything the teacher had to say.

Presently the teacher asked them to take the long seats arranged for the class at one side of the shop. They paid no attention. He then asked them to take places at the benches, but they remained in a stubborn group in the corner. Finally, after considerable effort, the boys were induced to occupy the seats, but kept up a great confusion of loud conversation and boisterous acts. It was very clear that the class were under the leadership of a large boy who occupied the center of the back seat and who persistently shoved off onto the floor the boys who were sitting at the ends of his long seat. He was the leader also in various other disturbances that greatly delighted the remainder of the class. The teacher attempted to explain that he simply wanted a chance to say hello to them and to try to get them started at their work as soon as possible. At this they simply haw-hawed and began more noisely than ever to make it uncomfortable for the teacher, always led, of course, by the bully in the back seat.

The teacher remained calm and attempted time and again to come to some sort of understanding with them, but always met the same rebuff. On seeing that the situation was clearly a case of trying to run the new teacher out, and feeling that he could no longer respect himself unless he resented such ungenerous treatment, he decided to make one more effort and to tell them what they might expect if the disturbance continued. He told the bully in the back seat that he simply wanted a chance to do the square thing and warned him that no more interruption would be tolerated. At this the bully laughed and said, "What're y' goin' to do about it?" At this the teacher asked him to leave the room and report to the superintendent. He refused.

The teacher said nothing, but sprang suddenly to the rear of the class, caught the bully by the collar, shook him without mercy, dragged him over to the back of the seat, bumped him soundly against the floor, and then rolled him over the back of his seat into his original place. By that time the teacher was thoroly aroused with righteous indignation, and the remainder of the class were awe-struck that anything like that could happen to their leader. When the teacher had had time to get his breath and to collect himself somewhat, he said, "Now, if you insist, we'll continue this until we have a thoro understanding. I came here determined to act like a gentleman and to be treated like one. That's all I ask, but I *insist* on *that*. Have any of you anything to say?" The bully blubbered thru his tears, "Y' tore my shirt!"

"Very well," said the teacher, calmly, "I'm sorry, but you forced me to do it. Are you satisfied?" The dethroned bully didn't reply. The teacher proceeded to make his preliminary remarks, to give a brief demonstration, and then to put the class to work. There was no more trouble that afternoon nor at any future time, and the bully and the entire class became stanch friends of their erstwhile "enemy".

Somehow, the report of the unpleasantness had reached the superintendent by the time the class was dismissed. Just as the teacher was straightening up his desk, after the class had gone, in stepped the superintendent with a broad grin on his face. "Well, how's business?" he inquired genially.

"Only *fair*, Sir," admitted the discouraged teacher, expecting to be handed his "walking papers".

"That's the stuff!" reassured the superintendent. "You've licked the bully of the town!"

The news spread very rapidly thru all the schools that the new manual training teacher was a fine, good-natured fellow who would do anything on earth to help the boys, but that the boys had better do their rough-housing before they got to his shop.

I suppose that as a general proposition, the action of the teacher described above is a dangerous and unwise proceeding. But I have tried for fifteen years to figure out some other way in which the teacher might have met that particular situation, and I have been entirely unable to see how he could have avoided that difficulty or could have handled it in any other way to command the respect of the class and maintain his own self-respect. There may be other solutions, but I don't know of any. There may be teachers who could have handled it much differently and better. I am frank to say I couldn't. I can tolerate and forgive mistakes, blunders, bad judgment, ill temper, poor work, and almost everything else, but there is *one* thing that I cannot and will not endure, and that is unmerited and unprovoked insolence. A school teacher doesn't have to be imposed upon; and I for one don't *propose* to be.

There is one very important caution in the meeting of a difficult situation like this, and that is that the vigorous and extreme measures must not be too quickly resorted to. The teacher must bear in a dignified and gentlemanly manner a sufficient amount of the indignity and abuse to put him clearly in the right in the minds of the other members of the class, and to acquit him of any possible charge of quick temper or of undue sever-

ity. His action must be essentially *defensive* and such as no self-respecting person could condemn.

The case just referred to is exceptional in that the bully developed the very first few minutes of the teacher's meeting with the class. Under other and more common conditions, there are other ways of handling bullies. One is to recognize in a discreet way their ability as leaders, cultivate their friendship, give them tasks that require leadership, and call on them for assistance of one sort or another. Their domineering disposition can be turned to good account by careful handling, until the teacher has gained a sufficient place in their confidence and good-will to enable him to discuss with them their own welfare, short-comings, chances of improvement, etc., and to give them some good, wholesome advice. By such methods, the worst boys in a community often become fine, reliable, and straightforward pupils, and the reason is that the teacher simply capitalizes their dominant dispositions and turns them to constructive and social uses, instead of permitting them to continue as destructive and unsocial influences.

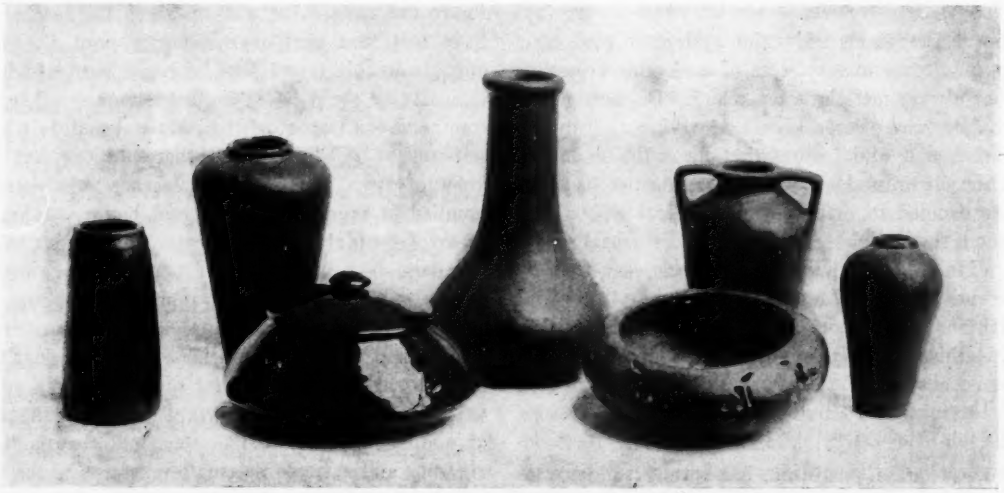
Punishments.

There are a number of punishments that may be used to good effect, if used judiciously. In all cases, every other means of conference, persuasion, commendation, reproof, and even in extreme cases, sarcasm, (altho this is always a dangerous and uncertain instrument), should be resorted to, before the use of severe formal methods of punishment.

Recognized forms of punishment which have a useful place in dealing with boys are, withdrawal of privileges, marks of demerit, temporary suspension from class (always in cooperation with the classroom teacher and the principal), requirement of pupils to go to the office of supervisor or principal who will determine punishment, and reports to the parents of the unsatisfactory action or attitude of the boys.

Cautions and Reminders.

1. Respect the boys, if you would have them respect you.
2. *Assume* the good intention and proper attitude of all pupils.
3. Make few rules.
4. Be considerate of every right and every reasonable wish of the boys.
5. Be a co-worker, not simply a boss.
6. Decide each case on its merits. Mere consistency may be a fault.
7. Be "slow to anger, plenteous in mercy, and steadfast in the right."
8. Don't be afraid or ashamed to admit error or fault honestly committed, but be extremely cautious to commit neither.
9. No strong, wise teacher ever lost the respect of a pupil by apologizing for injustices done.
10. Be considerate, fair, and constructive in criticism.
11. Do not threaten.
12. Don't carry any of your troubles to your superiors in office that you can settle for yourself.
13. Let most of your trouble be that which you take to prevent trouble.
14. Be less concerned about your "dignity" than about your self-respect.



MADE IN THE ART CLASSES OF THE JOLIET, ILL., SCHOOLS.

BATIK DYEING AS A MEANS OF STUDYING DESIGN

Lt. Jean Paul Slusser, Art Instructor, U. S. Gen. Hospital No. 2, Fort McHenry, Md.

THE enormous progress that has been made since the beginning of the war in the development of an American tradition in textile design has, significantly or otherwise, gone hand in hand with the adaptation to American uses of the process of batik. The first work in batik was shown in this country not more than seven years ago, and the beginning of its popularity dates back scarcely more than three or at most four seasons ago. It was about this time that the cutting off of the foreign sources of supply made it possible and even imperative to train a native body of designers to supply our textile trade. The group of designers that emerged in response to this opportunity consists quite naturally of very young people, and most of them were literally brought up on batik. The influence of this process on the training and development of this group, and incidentally upon the style and technique of present-day American silk and cotton design has been most striking.

Window curtain decorated in batik. Designed and executed by soldiers in the commercial art class at U. S. A. General Hospital No. 2. None of these men had ever studied design before. This job was done in the absence of the instructor, with no suggestion whatsoever from him, and, so far as known, with no reference to any book of designs.

A first-hand knowledge of this situation, together with some experience in teaching the batik process to convalescent soldiers in an army reconstruction hospital, have convinced the author of the extraordinary value of the batik process as a means of teaching—and studying—design.

The special merits of batik dyeing as a means of approaching the principles of textile design can be enumerated under various heads, but practically all of them can be traced back to one main virtue—its unusual directness. In batik dyeing the student not only conceives but carries out the design. The finished product is not a design in theory, or on paper, but an actual textile dyed and decorated, a thing to be handled and used and enjoyed. And here comes in a great aid from the interest and enthusiasm of the student. The process is so simple and so direct and lends itself so readily to the creation of a number of beautiful and useful objects, such as scarfs, pillow-tops, shawls, robes; decorative hangings or entire costumes, that the student, in his interest in making the thing, presses on from one stage to the next, turning work into play, and outdoing himself in his eagerness to see the thing come out.

Again, the fact that one is creating a definite thing out of a definite piece of silk or cotton forces the student to a reckoning with his material which is one of the very fundamentals of all good design. Given this particular piece of silk, of such a shape and size and texture, and for such a purpose, with what kind of a design would you decorate it? That is his problem, and there is no dodging it. The student soon appreciates the fact that a design appropriate for China silk will scarcely do for pongee, and that a curtain must be decorated otherwise than a shawl or scarf.

The necessities of the process demand that the

"TREE OF LIFE."
Decorative batik hanging, designed and executed by the author.

student think in color. Each color is dyed on the whole piece in one dipping, and the student soon acquires the habit of spotting a color all through the design which will stand him in good stead in all his subsequent work of whatever sort. The difficulty of dyeing a piece in more than a very few colors also imposes a wholesome limitation upon the fancy of the student and schools him in the art of obtaining the richest possible effects from the fewest possible colors. The blending of colors thru the repeated dipping necessitates, furthermore, a careful and wholesome study of the fundamentals of color harmony, and instils thru experiment many a valuable lesson in the principles of color harmony by relationship and contrast.

Batik seems to be a wonderful stimulator of invention. The exigencies of the process, the difficulties involved in painting on the design in melted wax, discourage the mere copying of second-hand motives, because of the very bothersomeness of the process. The student finds himself much of the time in the position of an improvisor. He has sketched out the large outlines of his pattern and finds himself with spaces to be filled and details to be supplied, and he soon develops the habit of making up his own details and filling them in as he goes along. To the consistent worker in batik the habit of making up design comes to be as natural and as spontaneous as that of dancing or singing—he becomes an improvisor like the peasant-artists of Hungary and other countries.

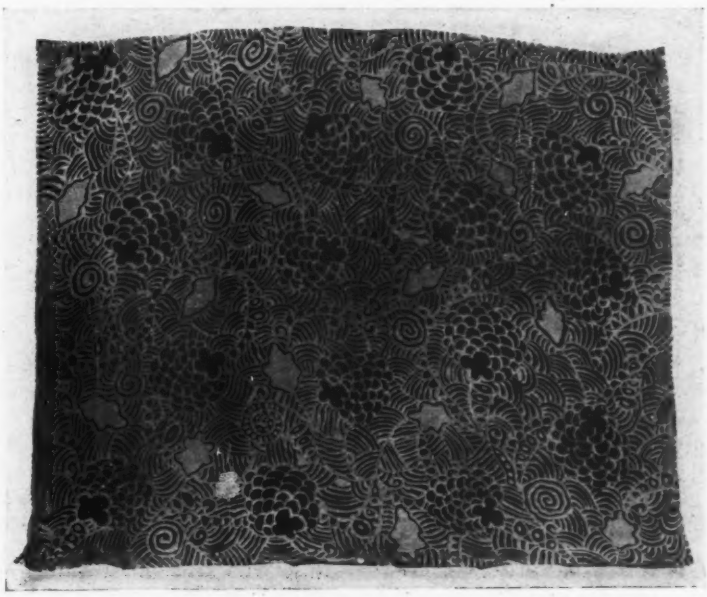
What of the process itself, for which we are claiming so much? It is, as nearly everyone knows, a matter of dyeing a material in which a pattern has been stopped out with melted wax. The wax is removed by a solvent, whereupon the pattern appears dyed in the material in silhouette. In Java, where the process has been immemorially used for decorating the native costume, the melted wax is applied with a little copper ladle like a confectioner's cone, which flows it on in a fine line. Javanese batik design is thus very intricate indeed. Western artists have as a rule preferred the simpler method of the brush, merely painting the design on their material, and as a result the character of their design has been much broader and simpler, and infinitely more varied.

The best material for batik is silk, tho cotton with the right kind of dyes will yield some very interesting effects. Silk takes the dye more evenly and brilliantly and offers a more pleasing texture when finished, and its thinness insures the penetration of the wax so necessary to even dyeing. Thin silks, China silks, crepes and

A CUPBOARD CURTAIN.
Designed and executed by soldiers in the commercial art class at U. S. General Hospital No. 2.

pongee are very satisfactory; a cheap drapery silk will often do very well indeed for practice work.

Paraffin wax is used, mixed ordinarily with an equal amount of commercial beeswax. It can be melted over an alcohol burner, placed as near as convenient to the silk, which has been stretched on a canvas stretcher, quilting frame or even between two tables. A rather coarse-bristled water-color brush will serve very well for applying the wax, tho a camel's hair brush is even better. The pattern may be sketched in lightly in charcoal or drawn on manilla paper and pounced.



All over design on textile decorated in batik. The design was practically improvised as the artist worked.
Designed and executed by Jean Paul Slusser.

The dyes used have to be cold, or nearly so, so that all dyes that require boiling have to be ruled out. Good aniline dyes are the most generally satisfactory, but are hard to obtain just now. Well equipped paint stores carry some of the cruder colors, and many drug-stores and most importing chemists have the higher grade dyes. Beautiful tho impermanent effects may be obtained by using many of the ordinary package dyes in a cold solution. Care must be exercised in seeing that the granules of dye are absolutely dissolved before immersing the silk.

After dipping the material in the dye until the color is of the shade desired, it should be thoroly rinsed of all superfluous color. When dry it is washed in a bath of gasoline or benzine until the wax has entirely disappeared. Proper precautions must always be taken with these inflammables, but with ordinary care there is no cause for anxiety. Rinsing in a clean bath of fresh gasoline is usually necessary to bring the material quite free of wax, tho a slightly crisper texture will always persist in any material which has been put thru the batik process.

Several colors may be dyed on one piece by waxing out and dyeing for each color in succession, beginning with the lightest color. Thus in a scheme of white, yellow and green, the parts of the design to be white would first be waxed out and the whole piece dyed in the yellow solution; when dry the piece is re-stretched and the portions to remain yellow waxed out and the whole thing dipped in the green dye. Thus each color has in it all the previous colors, and as the wax cracks slightly with the handling and admits slight stains of one color upon the one below, some very interesting and harmonious color effects may be obtained. This crackle is one of the special features of batik and adds a great deal in softness and charm, but it should never be allowed to take the place of good, well-studied design.

It will be seen from the nature of the process, from the fact that the design is painted on rather crudely with a brush dipped in melted wax, that the student will be influenced away from attempting the vicious three-dimensional pictorial type of pattern which has made so much of modern commercial design a horror. The amateur in batik, brought up perhaps on the usual wall-papers and carpets with their highly modelled flowers done to look as much like reality as possible, will have a hard struggle at the outset with his medium. Then he will give up the attempt to be realistic, if he is capable of learning by experience, and will begin to use the simple and natural elements of design, the dot, the dash, the circle, the flowing line. He will acquire them as a language, and gradually learn to combine them in such ways as to express with them a certain plastic meaning. He becomes no longer a copyist but a creator, a real designer in the true sense of the word. He will learn to cover a two-dimensional surface with a two dimensional design, largely because batik is a silhouette process, and can only be made with the

greatest difficulty to express three dimensions. He will learn, because it is really a primitive method, some of the things that the primitive workers in design have always known, and which makes their work so perennially simple and beautiful. He will acquire the courage to treat flowers, figures, animals and birds arbitrarily as units to be used according to his will for their abstract decorative value in his design, and not for some mere associative or illustrational value that may attach to them. He will learn that good textile design knows neither relief or perspective, that it is first and last a decorating of a flat surface, describing as well as enriching the quality of that surface. And so, having mastered his ABCs he will pass on into the farther and pleasanter reaches of his craft, where making a design becomes self-expression, and in self-expression he finds pure joy.

A NEW BASIS FOR THE STUDY OF ENGLISH

Hugo B. Froehlich

Director Department of Manual Arts of the Newark, N. J., Schools

THERE was once a little girl who was asked by her teacher to write a composition on "Spring". She was a bright little girl, and the dearest wish of her heart was to please the teacher. In her childish way, she enjoyed the springtime; she watched for the first robin; she trembled with delight when she spied the first hepatica under the brown leaves; she listened with wonder to the choir of "peepers" in the pond; she worked with almost feverish eagerness in her own little garden. Yet it never occurred to this little girl that a story of these experiences and pleasures of hers could possibly be what her teacher meant when she asked for a composition on spring. She went home much troubled by her inability to write a suitable essay on spring. In the evening she resorted to a search through the few volumes which constituted the family library. There was an old book entitled "Bryant's Library of Poetry and Song", with poems classified into groups according to their themes. There was a chapter devoted to "Poems of Nature" and in that chapter, oh joy! she found a poem beginning

"Come, Gentle Spring! Eternal mildness, come!
And from the bosom of yon dropping cloud,
While music wakes around, veiled in a shower
Of shadowing roses, on our plains descend!"

The fact that this poem was written by one James Thomson in no way abashed the little girl. Her teacher desired a composition on spring. Here was a beautiful one. So she copied it, painstakingly and without a single error, and carried it triumphantly to school. How rude was her awakening when she discovered that her well meant efforts had been in vain. She told her teacher that she had found the poem in a book, and she was greatly surprised and crestfallen when she realized that the writing of another, however fine it might be, was not what the teacher wanted. By dint of kindly questioning the teacher made the little girl feel that she really had much material from which to draw. Forgetting that she was expected to write upon a topic, the little girl told in a most spirited way of all the wonders that the spring had brought into her world. She described the path thru the woods to the pond; she was eloquent as to the size and the number of hepaticas found in a certain nook; she was humorous in her description of the frogs, and she grew positively poetic when she told about the pussy willows peeping out upon the bough of the willow near the brook. She really had something to say, for she was relating her own experiences; she was narrating in her own way the story of something that she had seen and done. She forgot the bugbear "composition" and was eager to tell what she knew.

Is not this the key to better expression, thru language? I am not a teacher of English and the suggestions that I make are in a spirit of modesty, I assure you. But I have often thought that the manual activities offer a rich field of subject matter for the exploitation of good English. A child is eager enough to talk about what he has done. Having the desire to express something which he has thought about and accomplished, he can more easily be trained to put this expression in good form. In our shops, for example, an eighth grade problem, and one very popular with the boys, is the making of a small round table of chestnut wood. From the standpoint of manual training, the problem is highly satisfactory, because it introduces a variety of tool operations; it includes constructive elements common to all furniture making; in its fine proportions and in its finish it offers opportunity for art expression; and when completed it functions in the home, as a welcome addition to the household equipment.

So far the *manual* training has been stressed—but does not the making of the table offer a world of *cultural* possibilities as well? Let us see. What constitutes culture? It is information, largely; information about a great variety of things. Culture is not only information about literature and classics, but about the industries as well. Does the boy who makes the table know where chestnut trees grow—the trees that produce the wood from which the table was made? Can he tell the interesting story of the logging camp, the eventful journey of the log from camp to mill, the sawing and stacking of the lumber, and the various means of shipping lumber to the markets? Does he know in what form the stock is purchased for his use in school? Can he describe the sources and the manufacture of stains, varnishes and shellacs? Is he informed as to the making of screws, nails and general hardware? Has he at

least a general knowledge of the processes of tool-making? Can he tell you which parts of his plane are cast iron and which are steel, and what constitutes the difference between the two? If he knows all this, he can write about it and the teachers of English can help him to put his expression into correct and beautiful form.

Again, the making of the table suggests history. Our little table is in the socalled "mission" style. What does this mean? Who originated the style? What do we mean by the "missions" of southern California? How did other styles of furniture originate? In the days of Queen Elizabeth, the style of furniture was heavy, ponderous and often rude and unlovely. In the days of Marie Antoinette, furniture was dainty, graceful and elegant. Why? Because the furniture reflected the spirit of the times and of the people of those periods. The courts set the standards and the people followed these standards. How interesting to study history in this way! Will not the boys have something to say about tables that is full of content, and having "content" in their writing, will not the teaching of the *form* become an easier task?

Another phase of the manual arts may be cited as having already contributed largely to the teaching of English. It is the recently established print shop in many of our elementary schools. From the standpoint of manual training, printing, in the minds of many educators, is on a par with woodworking activities; indeed, some schoolmen go even farther than this and declare printing to be the most valuable of all manual activities. Problems of punctuation, spelling and paragraphing must of necessity be solved before the printing exercise can be accepted. Hence the pupil sees a *reason* for the study of the rules of spelling and punctuation and paragraphing. A sentence must be well constructed before it is fit to be set up in type. Again, the boy sees the *reason* for the study of sentence construction, or grammar. The art of printing is a fascinating one. What boy does not delight in a printing press? He is willing to undergo the discipline of language drill, if this practice finally functions in the use of the printing press. How different will be his attitude toward his own "composition" if he is permitted to set up in type a bit of his own successful writing!

The school also profits materially by the introduction of printing as a part of elementary instruction. The pupils become immediately of service, in the printing of promotion sheets, attendance cards, spelling lists for primary grades, recipes for cooking classes, school programs, tickets of various kinds, notices and announcements, inventory blanks, science lesson sheets, etc. These practical problems deal more or less directly with English and should it seem to me, be seized upon by teachers as indispensable aids in securing correct forms. A misspelled word in print disturbs a boy much more than dozens of similar errors written in long hand. Printing as a study has also immense cultural value. The actual handling of type, galleys, forms, plates; the manipulation of inks and papers and the mastery of the press all provide first-hand information of one of the most important industries of our times. In the past, "The Invention of Printing" has been a favorite topic given out by the teacher for composition writing. Then, the boy had nothing to say except to restate what he might remember of what he had read, or of what had been told him. Now, fresh from his own experiences in the print shop, he is bursting with the desire to tell what he has done.

Another phase of manual activity which is full of suggestion to the teacher of English is found in our cooking classes. With little women, as well as with their mothers, favorite topics of conversation seem to lie along culinary lines. They like to tell what they have cooked. The other day I heard a little girl describe with a great deal of enthusiasm her experiences in making pepper hash. It was an interesting narration of the process involved. She spoke as one who knew. Her language was forceful and full of meaning, if not at all times correct. A climax of color was reached when she exclaimed in answer to her teacher's question, "How did the family like your pepper hash?" "Why, no one but Father got a chance to even taste it, and he gobbled it all up!" Can you teachers help this child to express her meaning, with all its force, in excellent English?

In the cooking activities, the interest is certainly there. There can be no doubt what cooking functions in the home and in community life. We read with ever recurring delight of "Bob Cratchit's Christmas Dinner" and of Charles Lamb's essay on "The Origin of Roast Pig". The great masters of literature have not scorned the inspiration of the family "board" and all that it involves. The history of food and of food preparation is most interesting to young people. The ancient Egyptians dried fruits and vegetables in the sun, very much as we do in our homes in this year of our Lord, one thousand nine hundred nineteen. In biblical times, Joseph, always an interesting character to children, built, in years of plenty, great granaries and storehouses, similar to our elevators, against the years of famine. Queen Elizabeth ate with her fingers—she never saw a fork, as we understand that term,—she tossed bones to her favorite hound, who was present at state banquets, held in halls whose floors were strewn with rushes, because there were no carpets in those days.

The development of table-setting is a topic full of subject matter for the English teacher. The Greeks and Romans reclined when they ate; their meals were served in courses and they used quantities of beautiful table service. All this is cultural and of immense value in the teaching of English.

The study of domestic art, of sewing, is replete with suggestions of subject matter for the study of English. Why need we always and forever go to literature for the beginning of linguistic expression? Why not base the elementary study of English upon actual experiences of those whom we expect to write? Litera-

ture as a basis for English may be introduced after pupils have found out that language is a means of expression, and when they have arrived at the stage of their development when they can appreciate the fine expression of *another's* experiences.

In sewing classes we must, of course, emphasize the craft. Our girls must learn the technical processes of basting, hemming, overhanding, seaming, buttonholing, etc. But along with this technical instruction should be given the cultural information that belongs to needle craft. The girls should write descriptions of the sources of the various fabrics. For instance, they should describe in an interesting way the characteristics of gingham, calico, cambric, percale, duck, damask, huckaback, lawn, mull, nainsook, organdie, sateen, scrim, tarleton, canton flannel and corduroy. How many of us older people can do this? These descriptions would mean acquaintance with the various processes of weaving, bleaching, dyeing, printing, etc. What more practical information and culture than this could the daughters of America receive?

The history of fabrics opens another field of suggestion. Weaving is one of the most ancient of the arts, and originated with the elemental needs of shelter and clothing. Biblical and classical history give many proofs of the early use of weaving. Rushes and other short materials were probably used first, and these suggested the employment of continuous fibres or threads. A study of looms could be made the topic of interesting compositions which would be cultural and disciplinary in the use of English.

Sewing and art, when united, lead us directly to the study of costume,—the history of which is in itself a history of civilization.

The practical arts serve to open the windows of the mind, so that the pupil's intellectual outlook into the world may be more varied and more interesting. Thru these various activities the pupil makes use of, and constantly expands his knowledge of mathematics, of geography, of history, of English. Thus the academic studies are enriched and developed thru correlation with the industries. *English is vitalized* thru the child's acquaintance with printing, woodworking, electricity, cooking, sewing and industrial art, and English that is *vital*, even tho it be crude and imperfect in form, is full of promise for its ultimate development into free and beautiful expression.

ART METAL WORK

Leslie G. Martin, West Henrietta, N. Y.

ART Metal Work is a subject which offers excellent problems in design for high school classes. The student must take into consideration many points for each individual problem; the form and use of the object, the material of which it is constructed and the appearance desired in the finished object.

In starting a design the form or main lines of the object should be blocked out, the details should be massed and then gradually worked up, keeping in mind the points given above. The drawing should be treated as a whole. If the student works up the details for a small part at a time the finished design is usually lacking in unity. Details should be kept in their proper relation to each other, and the proportions carefully worked out. Care must be taken not to over emphasize some part of the design.

The design should not be so elaborate as to destroy the appearance of utility of the object, but should follow the general form of construction and add beauty and individuality. It should convey the idea of suiting the requirements of its position and the purpose of the object to which it is applied. The design should have the appearance of being a part of the object and not something stuck on. Care must be taken not to have the design cover too much of the object. Plenty of broad, open surfaces should be left for contrast.

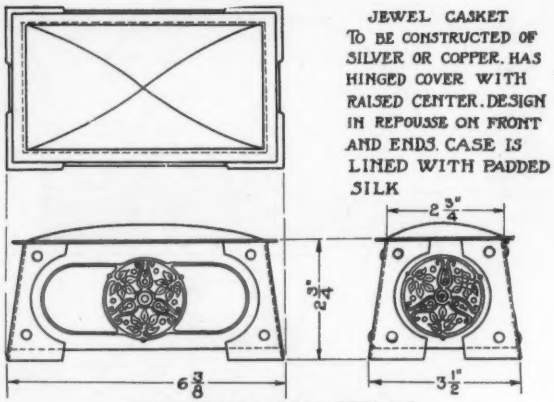
The type of decoration is also a problem for each object. It should be taken into consideration whether the design is to be viewed from one or from different directions. As a rule the most important part of a design is placed near the top, or above the center of the object. The tracery in Gothic windows is a clear example.

The best results are obtained by avoiding meaningless shapes. They should suggest some definite form or symbol. Geometrical patterns may be used in many ways. Such patterns as the square, circle, triangle, hexagon, trefoil, etc., may be used alone and in combination with each other with good results depending upon the individuality of the designer. Geometrical patterns may also be combined with natural forms to good advantage. The repetition of a certain part of the design often helps to hold the design together and secure the desired effect.

A useful method in drawing patterns that have repetition is to trace a part of the design on tracing paper, then turn the design over and rub on the back with the thumb nail to transfer the pattern. By this method the design may be blocked out quickly if it is symmetrical and it can be readily seen if the desired effect is obtained.

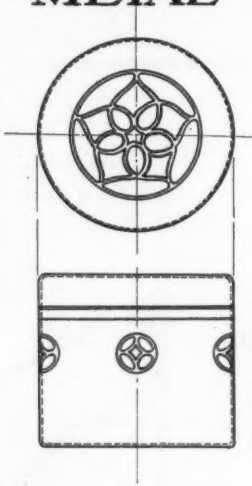
Movement in the design should not be neglected. As a rule the progression in a design should be of such a character as to go with the parts of the object for which it is designed. Heavy or light parts each have a certain character of movement or curvature. Radiation or growth can hardly be avoided in many designs and is used considerably in suggesting movement. Slow

ART METAL WORK

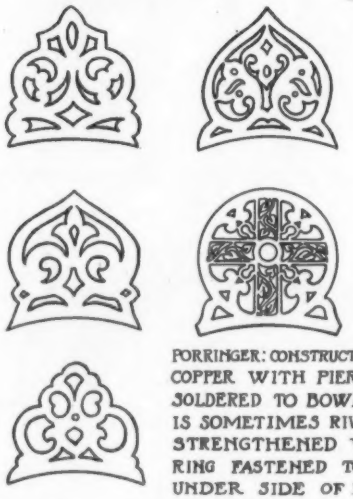


JEWEL CASKET
TO BE CONSTRUCTED OF SILVER OR COPPER. HAS HINGED COVER WITH RAISED CENTER. DESIGN IN REPOUSSE ON FRONT AND ENDS. CASE IS LINED WITH PADDED SILK

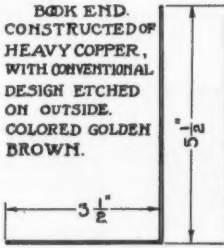
CORNER PIECES ARE RIVETED ON.



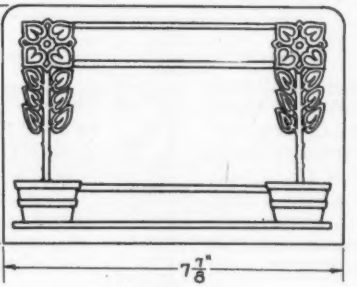
PORRINGER HANDLES.



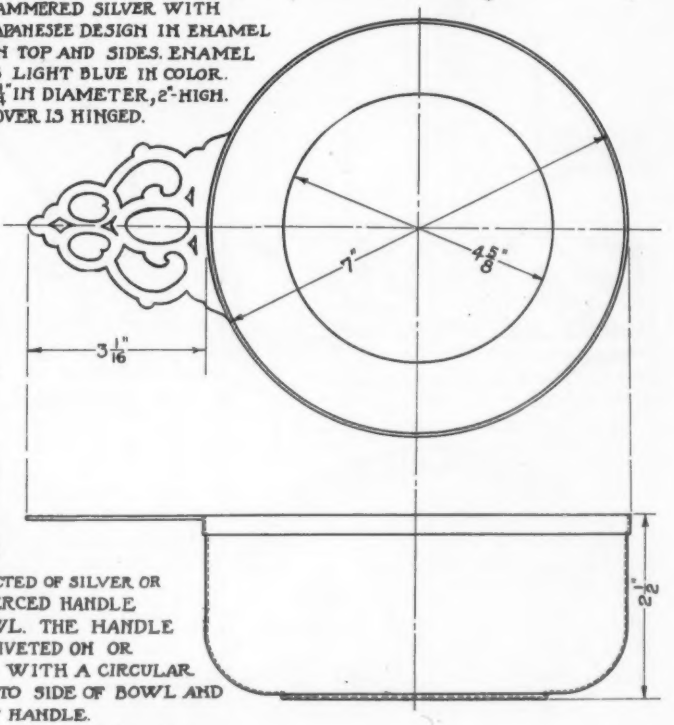
PORRINGER: CONSTRUCTED OF SILVER OR COPPER WITH PIERCED HANDLE SOLDERED TO BOWL. THE HANDLE IS SOMETIMES RIVETED ON OR STRENGTHENED WITH A CIRCULAR RING FASTENED TO SIDE OF BOWL AND UNDER SIDE OF HANDLE.

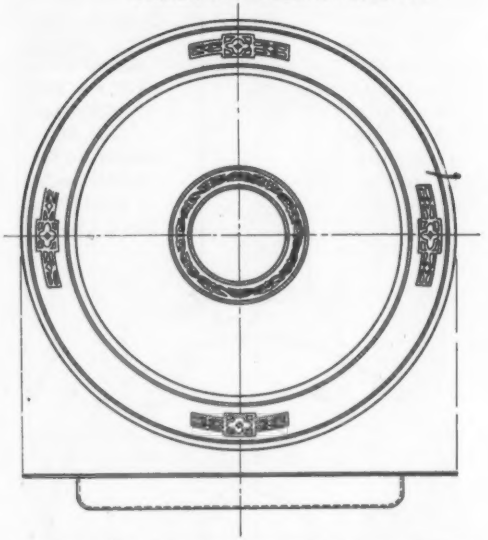


BOOK END.
CONSTRUCTED OF HEAVY COPPER, WITH CONVENTIONAL DESIGN ETCHED ON OUTSIDE. COLORED GOLDEN BROWN.



ROUND BOX: CONSTRUCTED OF HAMMERED SILVER WITH JAPANESEE DESIGN IN ENAMEL ON TOP AND SIDES. ENAMEL IS LIGHT BLUE IN COLOR. 2 1/4" IN DIAMETER, 2"-HIGH. COVER IS HINGED.





COPPER TRAY-WITH ETCHED DESIGN IN BOTTOM AND ON SIDES. TEN INCHES IN DIAMETER AND FIVE EIGHTS INCHES DEEP.

PLATE 1.

ART METAL WORK

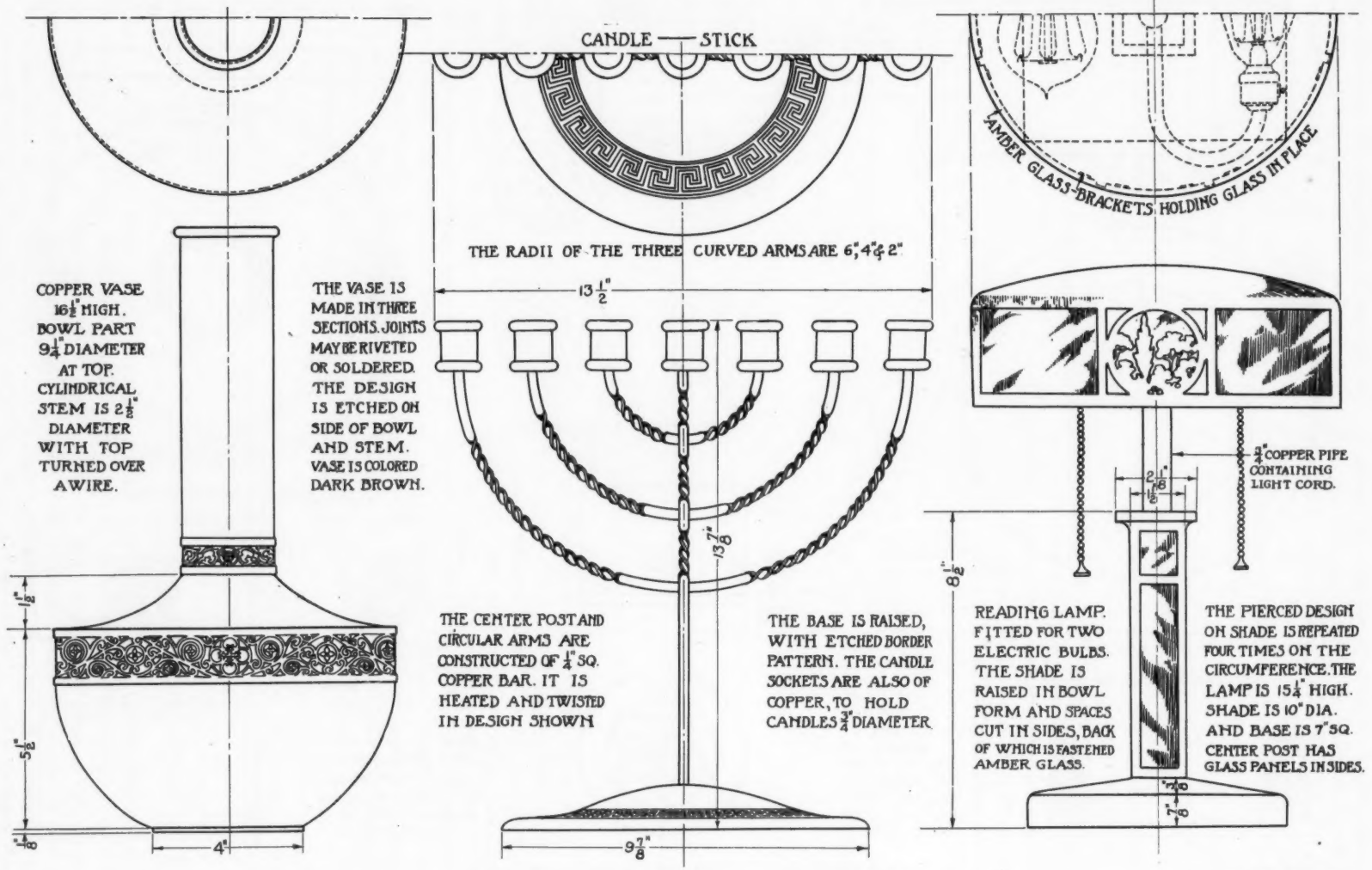
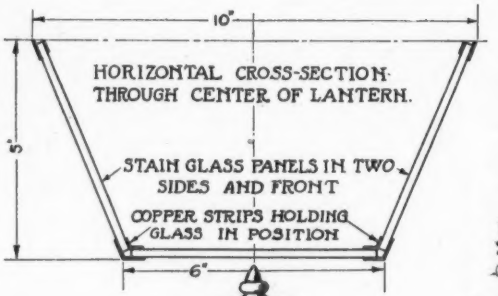
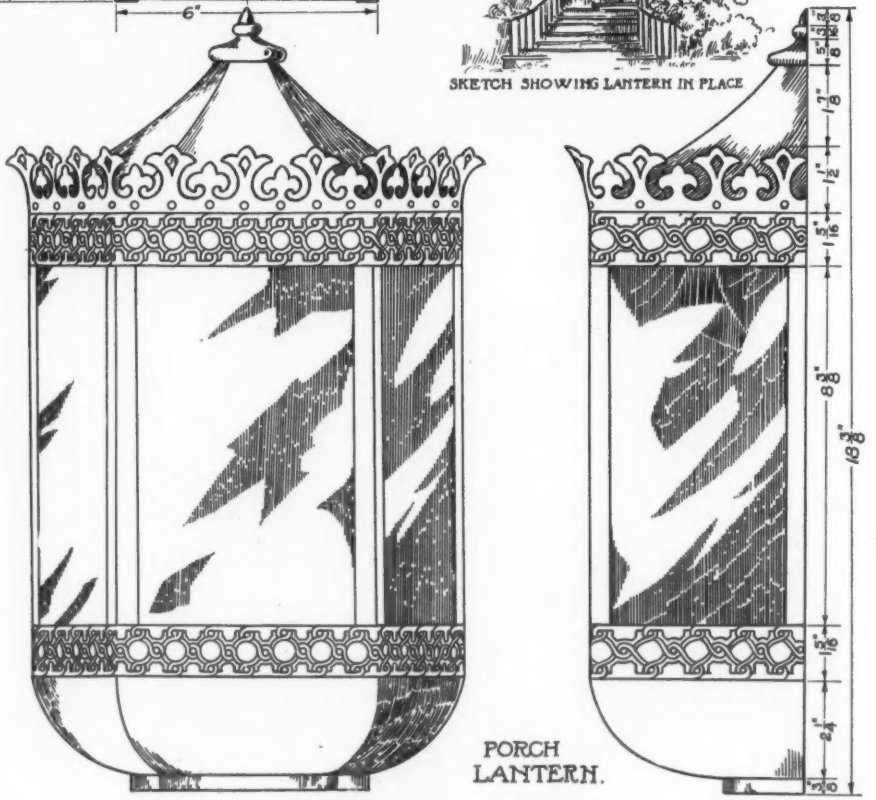

CANDLE — STICK
AMBER GLASS
BRACKETS HOLDING GLASS IN PLACE
THE RADII OF THE THREE CURVED ARMS ARE 6", 4" & 2"
13 1/2"
COPPER VASE 16 1/2" HIGH. BOWL PART 9 1/4" DIAMETER AT TOP. CYLINDRICAL STEM IS 2 1/2" DIAMETER WITH TOP TURNED OVER A WIRE.
THE VASE IS MADE IN THREE SECTIONS. JOINTS MAY BE RIVETED OR SOLDERED. THE DESIGN IS ETCHED ON SIDE OF BOWL AND STEM. VASE IS COLORED DARK BROWN.
1 1/2"
5 1/2"
1/8"
4"
13 7/8"
9 7/8"
THE CENTER POST AND CIRCULAR ARMS ARE CONSTRUCTED OF 1/4" SQ. COPPER BAR. IT IS HEATED AND TWISTED IN DESIGN SHOWN
THE BASE IS RAISED, WITH ETCHED BORDER PATTERN. THE CANDLE SOCKETS ARE ALSO OF COPPER, TO HOLD CANDLES 3/4" DIAMETER
3/4" COPPER PIPE CONTAINING LIGHT CORD.
2 1/16"
1 1/2"
8 1/2"
READING LAMP. FITTED FOR TWO ELECTRIC BULBS. THE SHADE IS RAISED IN BOWL FORM AND SPACES CUT IN SIDES, BACK OF WHICH IS FASTENED AMBER GLASS.
THE PIERCED DESIGN ON SHADE IS REPEATED FOUR TIMES ON THE CIRCUMFERENCE. THE LAMP IS 15 1/4" HIGH. SHADE IS 10" DIA. AND BASE IS 7" SQ. CENTER POST HAS GLASS PANELS IN SIDES.
7/8"
7"
LESLIE G. MARTIN.

PLATE 2.

ART METAL WORK

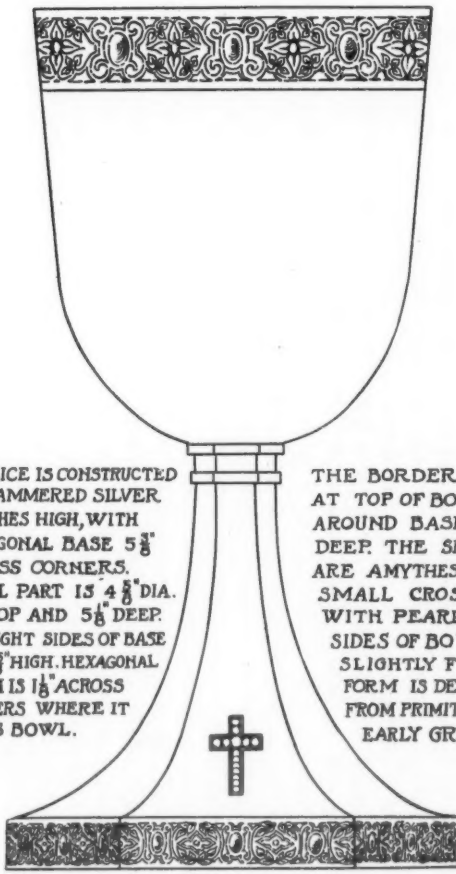


SKETCH SHOWING LANTERN IN PLACE



PORCH LANTERN.

SILVER CHALICE



CHALICE IS CONSTRUCTED OF HAMMERED SILVER. 10 INCHES HIGH, WITH HEXAGONAL BASE 5 3/8" ACROSS CORNERS. BOWL PART IS 4 3/8" DIA. AT TOP AND 5/8" DEEP. STRAIGHT SIDES OF BASE ARE 3/8" HIGH. HEXAGONAL STEM IS 1 1/8" ACROSS CORNERS WHERE IT JOINS BOWL.

THE BORDER DESIGN AT TOP OF BOWL AND AROUND BASE IS CARVED DEEP. THE SET STONES ARE AMYTHESTS. THE SMALL CROSS IS SET WITH PEARLS. THE SIDES OF BOWL ARE SLIGHTLY FLARING. FORM IS DEVELOPED FROM PRIMITIVE BOWL OF EARLY GREEK TIMES.

LESLIE G. MARTIN.

PLATE 3.

or rapid growth may be obtained according to the curvature of the lines.

Geometrical patterns do not suggest the idea of movement as much as the curved lines. Care must be taken to avoid conflicting movements. The movement usually suggests a horizontal or vertical motion.

The design should be carefully balanced. For instance, in a rectangular panel if both sides of the design are alike on each side of the center line, the design will have good equilibrium, but it is not necessary to have each side alike as to details. It is the masses that should be balanced.

In constructing the jewel casket shown in the drawing, the four sides and bottom are made from one piece, the sides being cut and bent to proper shape. The corner pieces are both soldered and riveted on so the joints are tight at the edges. It will be found easier to work up the design while the material is in the flat sheet altho it must be carefully planned. The cover is hinged with raised center. It may be lined as desired.

The copper tray is a useful project and comparatively easy in construction. In starting such a project a piece of sheet metal of proper thickness is cut in a circular form. The copper may be softened by heating red hot and then dipping in cold water if it is found too hard to work. A circle is then scratched lightly on the copper the size of the base. An anvil is then placed in the vise so that the copper may be held directly over the head of the anvil. Then the metal is hammered with a raising hammer and at the same time turned, keeping to the circle until the base is well started. This process is repeated until the required shape is obtained. This may be obtained by making a template to fit the drawing and using it to test the raised form.

The copper should be annealed frequently to avoid risk of cracking. After the proper shape is obtained, the edges are filed and trued up and the tray is planished with a planishing hammer until smooth. It may then be cleaned and polished or colored as desired. The design is etched on with acid. Wax or asphalt may be used to protect parts that are not to be etched.

The book end is a simple project. A piece of metal the desired shape and size is bent at right angles to hold it in a vertical position, and then the design is applied and etched. It is best to scratch the design on the metal so that it may be worked up accurately.

The round silver box is a rather advanced project. The design is drawn on the metal and the background lowered. These spaces are then filled with enamel and then it is finished in the kiln. A strip of metal is left between the separate parts of the design.

Porringers were much used during the seventeenth and eighteenth century. Porringers as a rule are made simple and strong, with pierced and shaped handles. In early times they were called podingers and counterfettes and sometimes had a design stamped in the bottom. The handles should be heavy enough so that there is no danger of their breaking off or cracking. The handle may be soldered or riveted on and is an excellent problem on which to work out a pierced design. If it seems weak it may be strengthened by hammering over the surface.

The copper vase is made in three parts and may be joined with solder or rivets. The etched design should be carefully planned out so that the units are repeated evenly on the circumference.

The branched candlestick is constructed as shown in the drawing. Where the curved arms intersect the vertical center post, they are filed to form a half lap joint. Care must be taken to make the joint tight. The ends of the curved arms go thru the bottoms of the candle sockets and are riveted over on the inside. The center post is fastened to the base in a similar manner.

The reading lamp requires little explanation. It is constructed with glass panels in the sides of shade and center post.

The porch lantern is three sided and hangs flat against the wall. It has glass panels in the front and sides. The border designs at the top and bottom are pierced and chased. The border curving outward at the top is sawed to shape and riveted on. When making the curved parts at the top and bottom it is a good plan to make a full size model in paper to get the exact size and shape before cutting the sheet metal.

The chalice is a standing up or goblet on stem rising from a broad hexagonal base. The lower part of bowl or cup immediately above the stem may be either plain or ornamented. It is usually plain. The stem and base may be plain or elaborately decorated. The chief use of the chalice is in churches.

In early times chalices were made of pewter, horn glass, copper, and lead. The lead was found to have an injurious effect and was discarded.

In England in 1074 the permissible metals for chalices were gold, silver and pewter. They were made both with and without handles. Later gold and silver were the only metals used except in exceptional cases where pewter was used by the poorer classes. Some were constructed so that the wine could be taken by means of a tube fastened on the side of the cup.

The important thing to keep in mind in all metal work design is to have the designs appropriate for the object and to have the designs practical.

COME then, since we are so mighty, let us try if we can not do the one thing worth doing: make the world of which we are a part somewhat happier.—*Wm. Morris.*

MAKING OVER AN OLD SHOP

Frederick A. Adams, Instructor of Cabinet Work, Clarke School for the Deaf, Northampton, Massachusetts

WHEN I accepted my present position, I had two tasks to accomplish. One was to teach cabinet work to deaf boys, between the ages of 14 and 18; the other, to arouse sufficient interest in the boys to allow cabinet work to be taught to them. The shop was dead. It had to be revived and the problem was how to do it.

The lack of interest in shop work on the part of the boys may be traced to a number of things. One was, that many of the boys had been given so much shop work, without the necessary variety in objects constructed, that they simply did not care whether school kept in that particular quarter or not. Another, may have been lack of progressiveness on the part of the person in charge—a case of free and easy methods, with no great effort to trace a new track in any direction.

Anyhow, the condition was present; it had not been so until recently, and those at the head of the school did not wish it to remain so. Of course, as in every school, we did not have free access to the strong box, but were allowed a reasonable amount to work with.

Upon taking a mental inventory my first day in the shop, this is what I found; a good-sized, well-lighted shop with fifteen benches, about forty years old, the tops of which, in many cases, had been used as practice pieces for sawing, planing, and driving nails. There was no machinery in the building, but I did discover a miter box, the saw of which had a nick as large as a fifty cent piece broken out of the middle. Each bench was equipped with the necessary tools, namely, two planes, rule, square, and gauge. Then there were the common tools on a rack on the wall. The chisels were socket chisels but the wooden handles were badly disfigured and hardly recognizable. There was no good place to keep supplies. For example, the paints and stains were kept under a flight of stairs in a space hardly two feet high.

I knew that if I was to make an impression upon the boys when they returned to school, about two weeks later, that I must do something for a starter and do it quickly. Of course I could not and did not want to change everything myself before the boys came back, but I did want to do enough to get a hold on them. Once this was accomplished, I felt confident that the future would work out all right.

What I finally did was to overhaul all the tools—sharpen them, clean them, and repair broken or replace missing parts. As the old miter box was beyond repair, a new one was purchased. In a word, all I did before the boys came was to put things in the condition they should have been left in.

This had an effect. Most of the boys noticed the minutest detail. It is not amiss to say here that deaf boys, trained as they are in all other work to constant use of their eyes do notice details much more than hearing boys because they depend more on their eyes to make up for their loss of hearing. Therefore, I say that not the smallest detail got by them. One boy even noticed and called attention to the fact that I had arranged the planes in a different position on the benches.

There was something else in my favor. For a short while at least, I was a new teacher. Many of my methods and ideas varied from my predecessor and just as long as the novelty lasted I would have very little trouble. This, however, was not a good foundation to work upon. Something else must be started.

The first thing which was put on trial and is still working out well, was a Record Card made out by each boy. This card had no original features, as it was modeled, to a certain extent, after similar cards used in other schools. But it was new to this school and that made it valuable in more ways than one. It not only kept for us an accurate record of all lumber used by each boy, the job he was working upon, the number of hours spent upon the job, the cost of the lumber and with this, the figuring of boardfeet, but it also gave to our shop a little more of the regular shop atmosphere, a little more responsibility, and I find, in the majority of cases, that the boys arise to the occasion and welcome responsibility. Mind you, this was but a small thing but it helped, and usually we find that it is a collection of small things well worked out and organized which spells success.

About this time, the principal of the school and I began to discuss the advisability of purchasing power machinery. It would mean great responsibility, much greater, in fact, than in a school for hearing boys. On the other hand, we felt that it would mean even more as an educational factor to these deaf boys, for they would be put in a position to become acquainted with machinery in the right way and under conditions which presented a minimum amount of danger. The pros and cons were discussed and the outcome of it was that we purchased a Universal Saw Bench.

There is no need for me to go into detail about the effect on the boys of this addition to our equipment. Let it suffice to say that they have taken advantage of all their opportunities to use and learn about this machine. It is our intention, as soon as the pupils become acquainted with it, to continue gradually with the installing of other essential machines until we have a shop which is modern enough to give the boys a good working knowledge of wood working machinery. I do not mean that we will make full-fledged woodworkers out of them, at least not in the time which is at present allotted to this department. It is our aim, however, to give them sufficient training that they may have a foundation to work upon, a training which will make

them familiar with machinery in general. Then, should they come in contact with some new machine, nervousness will not be present but instead, a feeling that they have only to discover the difference between the old and new and then master the new. For after all, if we understand clearly the workings of one machine, it is easier to understand the next.

One thing led to another and soon we saw that our work benches were in very poor condition. As I stated before, they were about forty years old. One might teach neatness and order and emphasize the importance of taking care of the tools and benches, but what pride could the boys take in old mutilated benches? One more dig or one more nail did not matter to them. Then again, our old benches were open underneath and did not provide a satisfactory place for keeping aprons, drawing tools, etc.

After giving this point careful thought, we found that new benches could be constructed by using parts of the old ones. The cost would not greatly exceed that of remodeling the old benches to fit our needs. Part of this work was undertaken during the summer vacation and the remainder completed by the boys when they returned in the fall. The new benches are equipped with quick action vises and underneath have three drawers and a closet which provides amply for each pupil's needs. There being two classes, each boy now has a drawer for his private equipment and such small pieces of work as he may wish to keep there. Then there is a common drawer in which the tools, which otherwise would be left on top of the bench, are kept. In the closet a rack is provided for the drawing boards. The boys now have before them benches of which they may be proud. Additional floor space has been gained by making slight changes in the dimensions of the benches and a general rearrangement of the room.

The next important step to be taken was that of providing a suitable bench for finishing purposes. Previously, a large, wooden table had been used and the materials stored in so small a space that they could not be satisfactorily arranged. Consequently, a stationary bench was constructed and the top covered with galvanized iron which is easily cleaned and also is noncombustible. This bench was sheathed up underneath and provided with shelves and doors, so that we not only have adequate space but everything is handy and at the same time out of the way and protected from the inevitable dust and dirt. Arrangements have been made at one end of this bench for our glue heater.

The last thing which we undertook, and which we are still trying to make more efficient, was a tool and supply room. Owing to a scarcity of floor space, this room is not as large as we should have liked it to be, nevertheless, it is meeting our needs successfully. The room is built in one corner of the shop and is six feet wide by eight feet long. The lower part is sheathed and the top is of wire grating. There is nothing especially new in the arrangement of the interior, which consists of racks for the tools and shelves and cases for supplies. Each boy takes charge of the toolroom for a period of one week. His duties consist of, first, giving out tools and supplies; second, checking up the return of tools; third, reporting all broken and missing tools; fourth, making a list of supplies to be ordered; fifth, checking up the attendance and reporting boys who are late; sixth, seeing that each boy makes out his lumber and time cards correctly. As yet, we have not established a check system but it is our intention to do so as soon as possible. At present we use the same requisition blank for ordering tools as for ordering supplies. The requisition is filed on a hook and when the tools are returned, it is cancelled and filed on another hook. In this way we have a record of all tools given out. A bench is located near the tool room so that if the person in charge has any spare time, he may continue his regular work.

All boys are encouraged to make suggestions for the improvement of the shop and already many have been accepted and proven valuable.

With our working conditions advanced to a point where they may now occupy a secondary place in our attention, we are trying to improve the plan of the work itself. As nearly everyone knows, the reorganizing of a system of any sort, whether large or small, takes time and patience. There are many obstacles to be overcome but, as with everything else, if undertaken with the idea of sticking to it until results are obtained, success to some degree is bound to follow. Our problems are by no means all solved, but at least we are advancing and the results are being seen in the interest shown by the pupils and the work which they are doing.

It may be of interest to add that we offered our services last year to the Red Cross to construct such things as back-rests, crutches, folding cots, etc., and we made all the packing cases used by the Hampshire County Chapter.

WE here in America hold in our hands the hope of the world, the fate of the coming years, and shame and disgrace will be ours if in our eyes the light of high resolve is dimmed if we trail in the dust the golden hope of men.

—Theodore Roosevelt.

Use of the Stereopticon in Teaching Printing

Harry W. Osgood, Instructor in Printing, Jersey City N. J.

THE printing teacher should understand the application of visual instruction as this great educational aid is especially helpful in teaching display composition.

Every instructor is familiar more or less with the stereopticon (or optical lantern) consisting of an illuminant, an optical system, and a device for holding the transparency (slide) in the path of the light. He meets his greatest difficulty when he attempts to form a collection of suitable slides.

Photographic Transparences.

A few pictures relating to printing and its allied industries may be obtained from dealers who specialize in educational slides. One stereopticon supply company lists about fifty slides of this kind in its catalog. These views cover "The Manufacture of Paper" and "The Making of a Big Daily Newspaper." The latter group shows the various steps in the making of a newspaper, from the work of the reporter to the finished product.

The dealers' catalog should be carefully searched for views which could be used to fill out a lecture set. For instance: to a group of slides showing the manufacture of paper from wood pulp, a lumbering scene may be added: for a collection of pictures relating to the history of printing, stock slides may be obtained with views of Benjamin Franklin's statue, and Franklin's grave in Philadelphia.

The instructor can illustrate his class talks with special slides made from photographs, drawings, diagrams, etc. Printed pictures may be selected from books or magazines pertaining to printing and taken to the local photographer who should be able to produce satisfactory slides for a reasonable sum. The copy need not necessarily be mutilated, as the negative may be obtained by covering portions of the page not desired in the slide.

Any sharp, clear picture with good contrasts in it, should make a satisfactory slide. Every defect in the original will be reproduced in the slide.

If the copy be colored, the cost of the slide will be slightly increased, as it is necessary for the photographer to use a special plate in reproducing a colored picture.

In preparing sketches, diagrams, etc., from which lantern slides are to be made, it is advisable to have the work done on smooth cardboard rather than on rough surface stock commonly used by artists. If photographic prints are used, smooth or glossy paper is preferable to platinum or other rough surface varieties. Since the projected image has a diameter generally from 30 to 80 times greater than that of the transparency or slide, and an area from 1,000 to 6,000 times as great, it is evident that the copy should be several times larger than the finished slide.

The standard mat opening of a lantern slide is 2¾ inches high by 2⅞ inches long, or almost square. This should be considered when designs or pictures are selected for lantern slide reproduction. The slide goes into the lantern the long way, horizontally, so the copy should be slightly longer than it is high.

The negative may itself be used for projection. Specimens of printing may be photographed and the negative rendered more opaque by special treatment after the film is developed. The film is inserted between pieces of slide glass and bound at the edges. Projections made with these slides have transparent lettering on a dark gray ground. This effect is to be preferred to black on white as the blaze of light on the screen tends to dazzle the eyes of the pupils.

A slide collection is easily duplicated as satisfactory copies may be obtained from "black and white" slides by the photographic process.

An enterprising instructor can arrange with the local publishers for slides showing the editorial and mechanical departments of the home paper.

The following slides were made from prints found in trade magazines:

The Book—An Illustrated Class Talk.

1. Document with archaic writing cut in stone (5000 B. C.)
2. Babylonian clay tablets in cuneiform (wedge-shaped) characters, the earliest form of alphabetic writing.
3. Book on palm leaves in original teak wood box (1750) Buddhist scriptures.
4. Papyrus plant, the paper of three great civilizations.
5. Block printing of the Chinese.
6. Illuminated Manuscript Book.
7. First book printed with movable types: The Gutenberg Bible.
8. Picture of Gutenberg.
9. Printing press of the fifteenth century.
10. Early Italian book page.
11. Early English title page.
12. Press used by Benjamin Franklin.
13. Type faces used by printers in Franklin's day.
14. Title page composed by Benjamin Franklin.
15. Statue of Franklin.
16. Franklin's grave.
17. The Typography of William Morris.
18. Picture of William Morris.

Lantern Slides Which May Be Prepared in the Print Shop.

Impressions from type forms, electrotypes, line cuts and halftones can be transferred to plain glass slides. Distribute the ink on the slab with a fairly hard, smooth roller, and then ink the surface of the type form. Use another similar roller, perfectly clean, to take the

ink from the type and transfer to the glass. The glass should be cleaned with a mixture of equal parts of wood alcohol and warm water before applying the transfer from the roller. To make the design more opaque, take a little fine gold bronze on a piece of cotton wool and dust over the transfer.

Diagrams of press parts, type cases, type bodies, and printing operations can be drawn on the glass slide. A heavy water-proof drawing ink should be used for this purpose. If the original is of the same size or smaller than the standard mat opening, place the glass over the design and make a tracing directly on the slide with an ordinary pen. Cover the drawing with another slide glass and bind at the edges with gummed paper.

Another method is to print directly on to a sheet of thin, clear gelatin, cut to size of a standard slide (3¼" by 4"). The printing should be done on a platen press, using a good grade of gold size. To get the best results, use a hard tympan. Pull an impression on the tympan, then feed a sheet of gelatin to the guides and pull another impression. Bronze the sheet on both sides, and after it is dry, carefully dust off the surplus bronze.

One of the advantages of this method is that color may be added to open letters, initials and borders with transparent water colors. The transmitted light on the screen will be tinged in proportion to the density of the color used. The printed sheet of gelatin is enclosed between two pieces of plain glass which are bound at the edges with gummed paper.

Thin sheets of celluloid may be used for this purpose also. Used camera film can be utilized if the sensitive coating and negative be removed with warm water.

Slides containing gelatin or celluloid sheets should not be left in the lantern for any length of time because they are easily affected by the heat.

Opaque Projectors.

There are several lanterns of this kind on the market. Some of the higher priced stereopticons are so constructed that a reflecting attachment can be added for the projection of opaque objects.

With this apparatus the instructor can throw on the screen proofs of work produced by the class; also photographs and pictures pertaining to printing, and miniature reproductions of typographic designs clipped from printing trade magazines. Mount the specimens on pieces of stiff card cut to a standard size.

Talks on Printing Which May Be Illustrated With Slides Prepared In the School Print Shop.

1. Type faces
   Prepare slides showing specimens of type faces used in the school print shop. Also, have slides showing the proper association of these faces.
2. Spacing
   Letter spacing, mortising letters
   Line spacing, grouping, etc.
3. Indentations
   Regular paragraph
   Hanging
   Square
   Diagonal
   Inverted pyramid
4. Use of initials
5. Type alphabets
6. Business cards
7. Envelope corner cards
8. Ornaments and borders
9. Type cases.
10. Indentation of poetry

(Slides may be made containing verses of patriotic songs, etc., for use by other departments of the school).

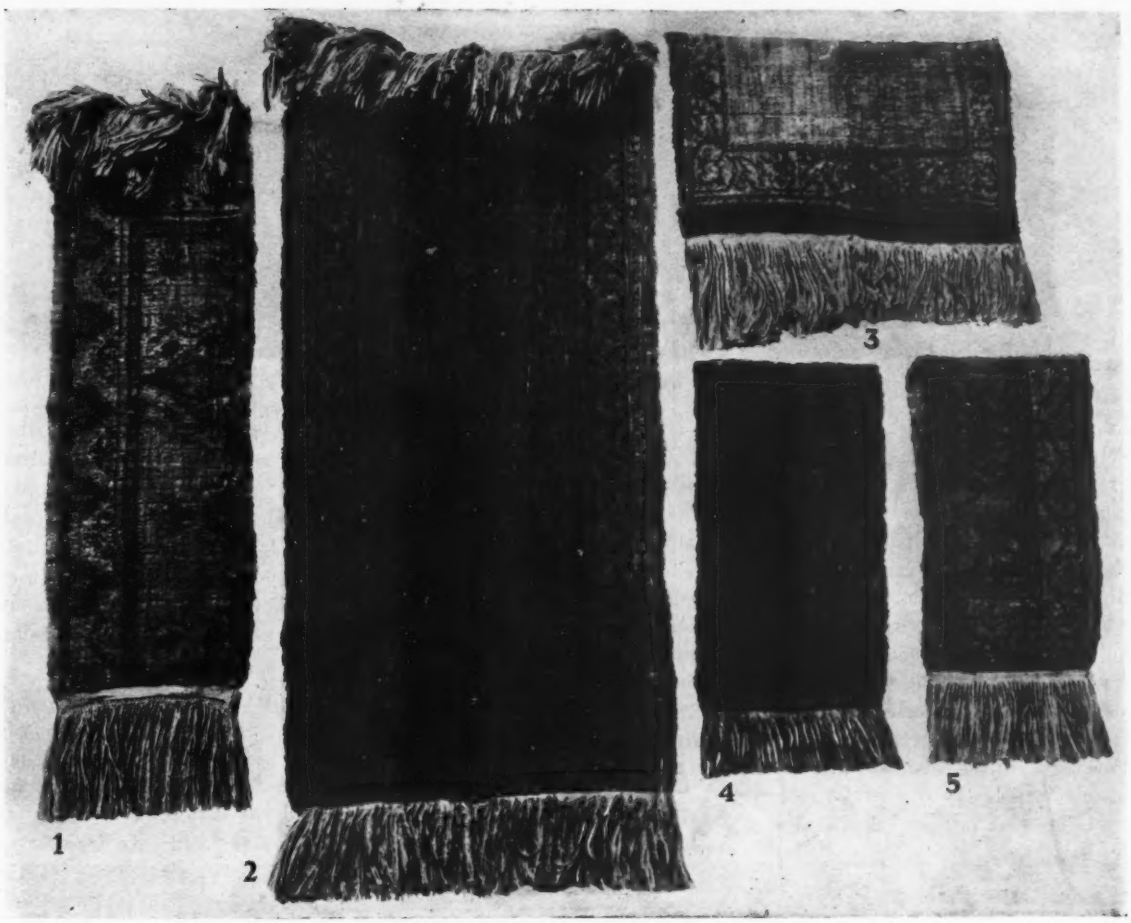
Note: When showing slides in pairs containing specimens of proper and improper spacing, etc., insert both slides and shift the carrier several times in order that the pupils may compare the examples.

EXPERIMENTS IN ORIENTAL RUG EFFECTS

Madaleine Groshens, Roslyn Pa.

THAT is the secret of the Wise Man of the East? So far as Oriental Rugs are concerned the discovery belongs to the Pennsylvania Museum and School of Industrial Arts of Philadelphia. In a series of interesting experiments covering the past ten years this institution has worked out a theory of Oriental Rug coloring well worth the attention of the rug manufacturer and art connoisseur. The accompanying illustrations show the results of these investigations. Here is a possibility in rug manufacture that goes far ahead of what has already been achieved. What the Pennsylvania Museum method affords is an imitation of the soft mellow finish of the Oriental Rug in the machine-made American product. These experiments were worked out under the direction of the Art Department of the above institution by Mr. Bertram Sydney Chadwick and Miss Helen Augusta Fox, instructors in carpet, rug and lace design.

The whole secret of their success hinges upon the process employed in dyeing the yarn. A consideration of oriental methods will perhaps help us here. In the preparation of the yarn the oriental weaver does not confine himself to the use of one tone of color or hue. In fact, when he dyes his yarn, he works as many different tones and hues into it as he deems necessary to give the desired artistic effect. He is not at all scrupulous in having his shades correspond. He dyes his yarn as he needs it, in small batches at a time, and several years may elapse between the completion of one portion of the rug pattern and the dyeing of the yarn in preparation for the weaving of a corresponding portion. As a result, in his color effects, he escapes the mechanical

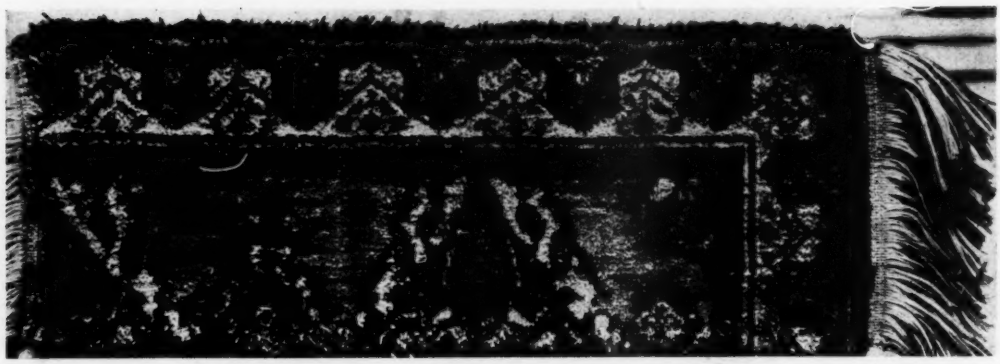


Rugs woven at the Philadelphia School of Industrial Art.

regularity of a machine-made article, and the completed rug has a richness and mellowness in finish that gives it its peculiar artistic merit as well as its commercial value. It is this "bloom" that the American manufacturer does not get. His failure is due to his methods of dyeing. The colors with which he works up his yarn are all carefully standardized. If by any chance a strand of yarn should vary in tone from the color intended, it is conscientiously discarded. There is no attempt to secure a modulated color in the yarn. Consequently, when the yarn is made up in the rug, the effect obtained is a color of one tone or hue, flat in appearance and without lustre, with the pattern sharp and pronounced and the outlines of the design standing out in harsh conflict with the ground color instead of blending harmoniously with it. The "bloom" that is the charm of the best rug products has been altogether missed.

What the experiments of the Philadelphia School of Industrial Art point to is a method of securing the mellow Oriental color effects without appreciably adding to the cost of manufacture. When a skein of yarn is dyed, instead of dipping it several times into one tone of the color desired, it is dipped into various tones and hues of the intended color. The result is a harmonious passing from one shade of the color to another in the yarn, and when it is worked up in the rug, the effect obtained is that supposed to be found only in the finest hand loom products and in the old age of the rug, a quality that not only delights from an aesthetic point of view but constitutes the chief selling value of the rug as well. What this process of dyeing has done in effect is to make possible the application of the Persian color theory—that is "a neutralization by juxtaposition, in which a score of naturally conflicting colors are thrown together with great freedom with the purpose that they shall neutralize one another". Applied to the American product it breaks up the mechanical color scheme, softens the ground colors, destroys all harsh outlines and enriches the design, so that the total effect of the completed fabric is identically that which is found in the Persian original. It is not, then, to the use of vegetable dyes, as has been generally supposed, that the oriental rug owes its beauty, but rather to the careful modulation of color in the yarn preparatory to weaving.

The possibilities here were illustrated to the writer in a striking manner. Two small strips of carpet were



Portion of a Rug Woven to Imitate the Genuine Oriental Effects.

brought forward. The one was the product of a Philadelphia firm; the second had been made at the School of Industrial Art in accordance with the school's experiments. In design they were similar, as the second had been copied from the first; the color plans of the patterns were in both cases the same, and yet the difference in finish was so pronounced that the layman would hardly have recognized the two as identical had he not been so informed. The importance of this contrast is doubly emphasized when we consider that results in the second case had been achieved on a four frame Wilton loom, while a six frame Wilton had been necessary in the manufacture of the standard commercial article.

The wide interest taken in the subject of oriental Rugs is having a wholesome effect. As the knowledge of the public regarding this phase of oriental art has increased, the standards of rugs and carpets for domestic consumption have been gradually raised. Everywhere oriental designs have been copied and oriental color arrangement imitated while the soft mellow finish that gives the oriental product its distinctive mark is altogether missed. What might be called the nearest approach is known as the Jaspe effect, an attempt to relieve the flat finish of the domestic rug by working in different shades of the ground color. At the present time every rug manufacturer in America is turning out rugs that employ this effect. When a lighter shade of the ground color is used, the result gives the watered effect of mohair; with a darker shade, the deeper color stands out as a portion of the design. In the Axminster Rug this effect is obtained by the separate threading of a bobbin for each of the differently shaded yarns; in the Wilton, by planting the frames that hold the yarn with different shades of the color employed, so that when the rug is worked up these shades appear in the pattern at regular intervals, giving a striped effect. Again, in the plain colored rug, a Jaspe finish is obtained by dyeing the yarn in two or three shades of the ground color, but owing to the fact that the shades are standardized and the yarn dyed proportionately, the general effect is the same mechanical finish as where the pattern is carded on the loom. In none of these cases does the use of the Jaspe effect approach the possibilities of a further elaboration of this method as shown by the Industrial Art School experiments. The pattern still remains pronounced, the outlines harsh, the colors unmodulated. Moreover, the use of the Jaspe is mainly confined to the ground color while it is applicable to all colors used in the rug. What the industrial art people demonstrate is not merely a Jaspe effect, but an oriental imitation.

The accompanying illustrations show various rugs manufactured at the Art School. The single rug (Fig. 2) is 22 inches in width by 42 in length, not including the selvage. The warp is of the finest grade worsted, while the weft is of cotton, with eighty to eighty-two knots to the square inch. No backing or sizing is used. The pile is cut high. Owing to the necessity of employing a loom that can be run by hand, two half width strips have been sewed together. Four colors were used in the frames of the loom, blue, green, ecru and pink. The otherwise plain center of blue is relieved by the soft modulating shades of blue green, light blue and purple that fade imperceptibly into the general tone of the ground color and present a fine silken lustre to the fabric as the eye glances over it. The same mellow finish is found in the border of conventional flower design. So soft and harmonious is the blending of the colors that the casual observer would take it for an antique but the whole effect is due to the process of dyeing. This also accounts for the fact that the Jaspe appears the length of the rug. The machine used was a four frame Wilton-Jacquard hand loom.

The second illustration shows a further variety of possible effects. The rug strip, Fig. 4, is of green background of beautifully blending lighter and darker hues, with a conventional border of geometric design in light blue, pink and green, outlined in dark blue. In the upper strip, Fig. 3, the predominant color is shell pink, passing in deeper shades to crimson and red, and with the light airy border touched off by soft blues, ecru, yellow and pink. The rug, Fig. 1, is of a heavy medallion pattern in dark blue upon a pink background, relieved with touches of light blue and ecru. In all cases

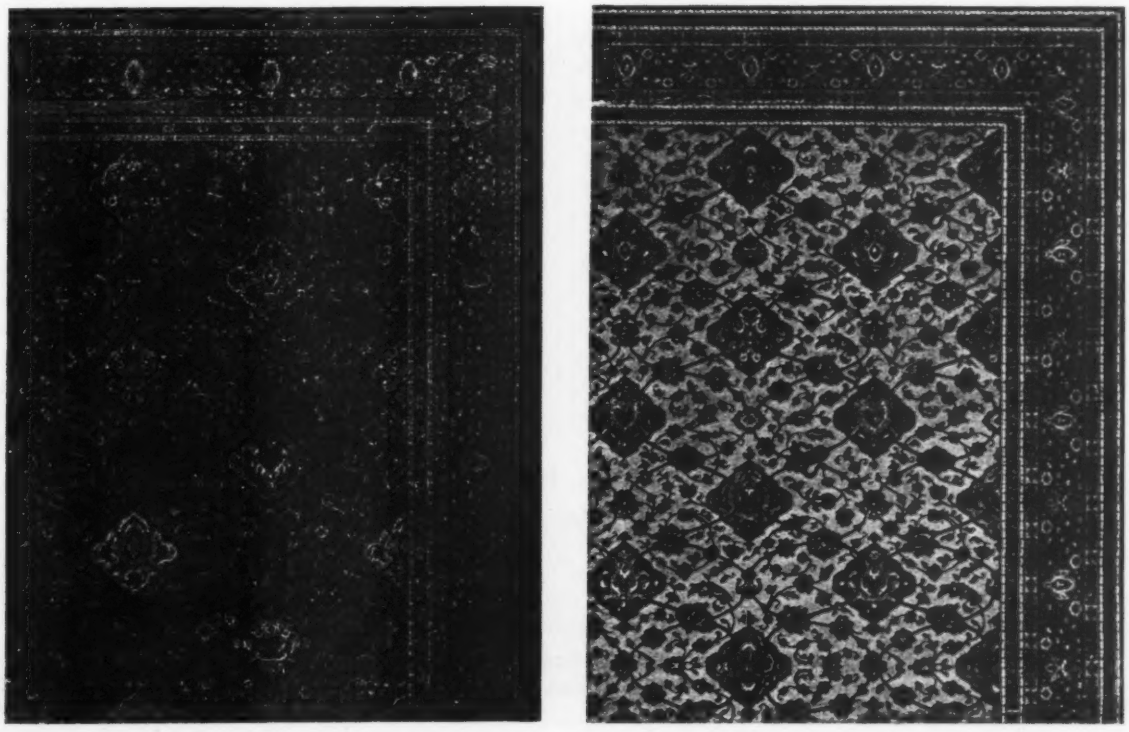
we find the soft fine air brush effect caused by the variation in the color tones.

It was in connection with the work of the surface-design and color course of the art department that these investigations were carried on. In the copying of oriental rug designs it was the custom to use fresco paint, and as this leaves a harsh distinct outline, considerable difficulty was experienced in securing the soft mellow effect of the oriental models. It was this fact that led Mr. Howard Fremont Stratton, director of the art department, to suggest that the problem be taken up in the fabric design course, and that some method be worked out whereby softer color effects would be secured, not only in the drafting of carpet designs but in the finish of the woven carpet fabric as well.

Accordingly, experiments were made along the lines pointed out by Mr. Stratton, first in the substitution of water color for fresco paint in the drafting of carpet designs and then in the dyeing of the yarn preparatory to weaving on the loom. The success with which the use of water color was met threw considerable light on the method of handling the second phase of the problem. In the reproduction of oriental models, water color permitted the artistic blending found in the originals. The colors modulated. This was, in fact, nothing but the underlying principle of oriental dyeing, and all that remained was to put the theory thus formulated to a practical test. A hand loom was obtained for the purpose, yarns were dyed in carefully modulated shades, short strips of carpet were worked up and followed by experiments on a larger scale. In no case did the weave turn out mottled or splotched, but with results that met the highest anticipations of the experimenters.

As regards a practical application of the results of these experiments, the chief consideration, from the manufacturer's point of view, lies in the additional expense involved in the dyeing of the yarn. The industrial Art School process calls for more skill in the handling of the dyes than is demanded where the colors need only be standardized. The additional cost, on a pre-war basis, was estimated at several cents per pound of yarn, but the resulting expense is off-set if not eliminated by the superior character of the workmanship in the finished product and appreciable advance in its market-value. Moreover, with this process, results can be obtained with a four frame loom that could not be approached on a five or six frame Jacquard.

The war has been, in many ways, a second declaration of American independence. Cut off from old world ideas, the American designer and manufacturer have turned to their own resources to supply the demand for their fabric. Every improvement in method of manufacture that raises the aesthetic standard in articles for home consumption is a distinct contribution to American artistic independence.



Typical Commercial Rugs. Note the distinctness of outline of the pattern and the absence of color modulation.

MACHINE SHOP COST RECORD KEEPING

J. J. Lockhart, Director of Mechanical Arts, Pueblo, Colo.

AFTER a great deal of experimenting, together with the aid of the experience of others, we have worked out a card system whereby the time consumed and material used are fairly accurately recorded. A system that is as nearly automatic in its working as possible, and is simple and accurate is best. A card system can be handled to good advantage, entailing less time and effort than other methods. That the percentage of error be minimized and assure the maximum of accuracy the system should involve the fewest number of operations possible.

The cards should be printed and contain the bulk of the information wanted. The student has but to fill in a figure or other small data to complete the desired information. The arrangement should be such that the tabulation from the students' cards can be made by simply inserting a number, check mark, or a few words to give a complete and accurate record of the work done, time consumed, stock used and any other data desired.

In order that the record be kept accurate, entries should be made at the close of each period. If neglected for a day or several days the record is likely to become inaccurate. Also, the time of each card should be limited to a period not to exceed two weeks. If the cards were arranged to cover longer periods, say a term, and were the card misplaced or lost it would be impossible to duplicate the data. However, one could recall from memory a fairly accurate account of the past ten lessons in event a card were lost. The record can be more nearly correct if checked frequently, and the instructor can gleam certain facts relating to individual work done from his class book if the record is kept up-to-date.

A numbering system that is simple and efficient can be used to a good advantage. Each student registered for work in the shop is given a number, with no duplicate thruout. For example, a student whose number is 17, has locker, tool checks, card rack pocket, etc., numbered 17 and he stamps his finished work 17. The system can be carried out indefinitely.

CENTRAL HIGH SCHOOL
MACHINE SHOP STOCK RECORD

Name Elliot Ray
Date 3-5-19
Job Lathe Center

No. of Pieces	Kind of Material, Size, Shape, Etc.
1	Cold Rolled 1½" x 6"

Approved by J. J. L.

CENTRAL HIGH SCHOOL
MACHINE SHOP TIME RECORD

Date 3-5-19
Name Elliot Ray
Job Lathe Center

MACHINE	TIME M	T	W	T	F	TIME M	T	W	T	F	TOTAL
Lathe			30	50	50	45	20				3:15
Shaper											
Drill P.											
Miller											
Bench											
Total											

Number of Pieces 1 Cost $ .12
Hours of Labor 3⅛ Cost @ 20¢ $ .65
Com. Value @ 1.25 Total Cost $ .77

CENTRAL HIGH SCHOOL

Semester 1st Name Ray, Elliot Date Sept. 3, 1918

EXERCISE	Lathe	Shaper	Drill P.	Miller	Bench	Total Time	No. of Pieces	Grade	REMARKS
Lathe Center	3¼					3¼	1	B+	

Fig. 1 (upper left) Stock Record Card. Fig. 2 (upper right) Time Record. Fig. 3 (bottom) Class Record.

Some kind of racks must be provided where the cards can be kept. Two sets of racks are needed for the time cards, each having as many pockets as there are students enrolled in all the classes. There should be a duplicate rack in the tool room in which to file the finished cards. The data should be transferred to a class book when the work is graded. Two sets of cards are enough to take care of the time and material, a stock record card and a time record card. They should be printed on different colored stock, and if cut 4″x5″ will be found to be a convenient size.

At the top of the stock record card, Figure 1, will be found a line each for "Name", "Date", and "Job". To the left is a column "Number of Pieces" and the remaining width for 'Kind of Material, size, etc." At the bottom is a line "Approved by" for the signature of the instructor.

Two cases will be needed to handle these cards. One case labeled "New Stock Cards" should be conveniently placed in the classroom. The other should contain a pocket large enough to hold about a dozen cards for each pupil enrolled and located in the toolroom.

The stock, cut to proper size for the various exercises, should be kept in the toolroom and issued only in exchange for a properly executed card.

This is the first step taken by the pupil in the cycle of operation in the machine shop. Going to the time card rack he fills in his name, date and job, places the card in the proper pocket and proceeds to work at machine or bench.

The Time Record, Figure 2, should be brought to date at the close of each period by every student. In the column under "Machine" will be found the names of the machines which are among the equipment. To the right will be found a column under "Time" which corresponds to the day of the week. At the extreme right is a "total column". At the bottom of the card is a place to enter "Number of Pieces"—"Cost", "Hours of Labor", "Total Cost" and "Commercial Value".

Two cases are needed to handle these cards: one having two pockets and labeled, "New Time Cards" and "Finished Work", respectively, and the other case having as many pockets as there are pupils enrolled. This case is to hold the cards while the work is in progress.

To illustrate how the system works let us observe a student who has just received a new assignment. The first thing done is to get a blue print of the new exercise. After studying the blue print a few minutes he passes to the "New Stock Card" rack and fills in a card as follows: Name, Elliott Ray; Date, 3-5-19; Job—Lathe Center; No. of Pieces, One; kind of Material, Size, etc. Cold Rolled 1⅛″x6″. He then secures the instructor's approval, and draws the stock from the toolroom where the stock card is put on file. Then going to the "New Time Card" rack he fills in a card—Name, Elliott Ray; Date, 3-5-19; Job—Lathe Center—which he places in the pocket bearing his number in the "Unfinished Work" case. The student proceeds with his work. At the end of the period he enters the time on the time card opposite the name of the machine in the column under the day of the week, in this case Wednesday. At the conclusion of all the operations the student totals his time card and puts it in the "Finished Work" case. He stamps his number on the work and hands it to the instructor for his approval. If the work is satisfactory new work is assigned.

A class book with a form similar to that shown in Figure 3 in which to enter the data contained on the time cards is used. Many facts can be gleaned from this record. The instructor is able to determine the average length of time spent on any given exercise. A comparison of the pages of the class book will show who are below the average. If a later comparison shows that the same pupils are still falling behind the trouble can usually be located and corrected. If a low average is shown for all exercises in lathe work, for example, it will indicate that that pupil needs more assistance or practice in order that his work be brought up to standard.

The class book comparisons shows up the fast workers as well as the laggards. It also shows that those who are slow at one kind of work may be average or above the average in another kind of work.

As the time put in on each machine is recorded the organization of the work is easily balanced for each individual, thereby giving him a well balanced experience. The instructor can tell the condition of each pupil in his classes at any time, and assign the work that each pupil may get the practice in the particular phase of the work that is needed to develop a well rounded experience.

"BELIEVE me when I tell you that THRIFT of time will repay you in after life with a usury of profit beyond your most sanguine dreams and that the waste of it will make you dwindle, alike in intellectual and moral stature, beyond your darkest reckonings."—*W. E. Gladstone.*

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

E. J. LAKE S. J. VAUGHN

W. H. HENDERSON

EDITORIAL

TIED UP WITH ART.

The Editors of the Industrial-Arts Magazine have solicited criticism and comment on their editorial offerings. We get an occasional response. One suggestion is that we "tie up" more effectively thru our editorials the art and manual interests.

This advice is not new to us. We have felt the need of uniting this precious pair in holy wedlock from the first thought of the name which represents us. The great trouble with this unity is that the teachers of these interests are, in terms of the divorce court, "indisposed to affiliate". As match-makers we are anxious to demonstrate the conviction that art and industry, properly wedded, will give to the schools of America a fine educational result. We admonish the teachers of manual work to study and understand the art of their production, and we implore the art teachers to give attention to design under the limitations of use, construction, and material. We do not presume that these interests of art and industry are altogether related, but that they have enough in common to be indispensable to each other.

Beauty and propriety are very nearly related. Industrial Art is the result of this established relation. We hope to hear from the teachers who have established this valuable result in their work.

TREATMENT OF APPLICANTS BY SUPERINTENDENTS.

From the numerous complaints that have come in from readers, it would seem that superintendents, principals, and supervisors are quite negligent in the matter of dealing with applicants for positions.

For one thing, teachers indicate that they are quite surprised to receive an acknowledgement of their applications, so rarely does such a common courtesy occur.

Another complaint is that those charged with the selection of teachers are in many cases unduly slow in making their selections from the numerous applicants for the same positions. It is reported to be unbelievably common also for no report whatever to be made to the unsuccessful candidates, not even so much as the return of their testimonials, photographs, etc. But when the decision has once been made in a candidate's favor, the candidate immediately receives a message notifying him of his election and demanding an acceptance without delay. Reports have it that many superintendents who take all the time they want in which to make their decisions, meanwhile leaving the applicants in suspense and without even an acknowledgement, are perfectly impatient of any delay in the matter of acceptance.

We think that teachers are entitled to some consideration in this matter. As a personal matter, a position is of much greater significance to the ordinary teacher than it can be to those who employ numerous teachers.

If a vacancy has been announced, then it would be but reasonable courtesy to acknowledge applications. The sure and immediate return of testimonials and photographs to unsuccessful candidates certainly is but reasonable to expect. And if superintendents are provokingly dilatory in making their selections, they need not be too impatient if an applicant takes a few hours in which to decide between two positions which may have been offered him at the same time. The rule of delay should not all be on one side.

A little more attention to the ordinary civilities even with common manual training teachers would not be at all amiss either from the standpoint of courtesy or efficiency and good will.

LARGE CLASSES AND SMALL TIME ALLOWANCE.

A young manual training teacher has just written that he teaches 28 hours per week, has 305 boys in his classes, spends most of his time before and after school and on Saturdays preparing stock for the classes, and devotes his spare time to helping coach the foot ball teams. Having been a doughboy, he adds, of course, "It's a great life, if you don't weaken."

There are teachers trying to teach more than five hundred boys a week. And yet, people are surprised that marvelous things cannot be accomplished in the manual training classes. They do not stop to think that at most, manual training boys work only a few days in a year, and then in such great numbers that the teacher scarcely becomes acquainted with them.

When our manual training in the elementary school becomes thoroly modernized, when classes of reasonable size are sent to the shops, when the boys come frequently enough and stay long enough to get acquainted with the teacher and to develop some good habits of work, then much may be expected of the grade manual training without any injury to other subjects. But until that time comes, people should be very careful about condemning the work which the manual training teachers are able to do under the present conditions.

INTEREST, DRUDGERY, AND SKILL.

Most of the things that are worth doing at all may be brought into relation to some fundamental interests. Certainly few things of great value or significance may be accomplished without involving a considerable amount of wearying and painful drudgery.

In nearly every undertaking, these two opposing ideas are present. The one represents the end to be attained; the other the price to be paid. Any task placed on the simple and unattractive basis of a task to be

done becomes drudgery pure and simple. The old-time schoolmaster whose reason for every duty was, "because the book says so", was simply a task master infatuated with the idea of the intrinsic value of drudgery, which he misnamed "discipline".

Interest is the incentive, the magnetic force that draws us contentedly and eagerly thru drudgery to the accomplished end.

Skill enters along the way both to enhance the interest and to lighten the drudgery.

REACTIONARY TENDENCIES TO BE AVOIDED.

It is only to be expected that certain reactions will soon set in, now that the stress of war times is lessening. Some reactionary movements are almost sure to strike the field of the industrial arts.

During the war, the emphasis was placed upon useful and immediately productive work as a necessary measure in sustaining our country and winning the war. Under this impetus, the school efforts in manual training and the arts produced some remarkable results. They broke away from the theoretical and antiquated courses and followed faithfully the dictates of the emergency in producing needed supplies and in taking part in the various movements which the government projected.

In doing so, of course, certain formal values were minimized or ignored. Now, very naturally, in attempting to restore to the work these neglected values, the pendulum is in danger of swinging too far back, thus neutralizing or destroying the vitalizing influence of the emergency. We may look for attempts on the part of the devotees of the "old order" to return to the good old days of the plant stick, the coat hanger, the abstract joint, and other "progressive models".

We need not be surprised, indeed, if the makers of "systems" and "canned courses" begin to take on new life and to turn out magic series of cut-and-dried "models" ready to be handed out to all classes without regard to their personal needs and wishes. Such courses and efforts are based on the idea that the tool operations are the only element of importance, and that the independent thought, the sense of meeting a real need, and the desire to take part in a real enterprise are of but little consquence.

It behooves the manual training teachers to keep a sharp lookout for the appearance of such reactionary tendencies, and to give small encouragement to any movement, system, or scheme calculated to throw the work back into the pre-war abstractions and useless models for the sake of tool processes.

The manual training work has traveled a long distance from the Russian System and the Swedish Sloyd to the war-time production of quantities of splints, crutches, stretchers, Red Cross boxes, and Y. M. C. A. tables. Let us bring back whatever additional organization and system are needed to make the work most effective educationally; but above all, let us retain the spirit and enthusiasm and turn our attention with equal vigor to the vital, worth while problems of peace time, and permit no return to the antiquated notions of a generation ago.

WHAT IF STUDENTS WALKED OUT?

What a glorious thing it would have been if all the teachers in this country could have had the experience of trying to talk to audiences of soldiers, or of trying to teach classes of khaki clad men from across the seas!

When you talk to a bunch of soldiers, you talk to a group of men who are not under the ordinary restraints of the schoolroom. They do not come under compulsion to hear you, and they feel absolutely under no obligation to sit and listen to a lot of mushy and platitudinous bunk. Speakers of rather large experience were never surprised to see literally hundreds of soldiers get right up and leave the hall during the first ten minutes of their efforts. On occasion, the exodus would be so great as to stop the whole proceeding.

These fellows who had seen the strenuous side and who had gone right up face to face with life's sternest realities had no patience with sham and were not a bit slow in manifesting their impatience. They were fully as impatient with that type of long-drawn-out, high sounding, wordy discussions of non-essentials so common in schools. They wanted real instruction concerning the things they regarded essential and they wanted it "straight from the shoulder" without the frills.

We have often wondered what would happen in some of our high schools, if teachers had to depend upon their ability to deliver the real goods in a straightforward manner, in order to hold their classes thru the recitation hour. The pupils in a great many schools are hand-cuffed and tied to their seats by the mere force of tradition and authority, and the teachers are privileged to pour out upon them all sorts of information, misinformation, and platitudes without the disturbing thought of a possible protest.

We do not advocate the freedom for high school students indicated by the attitude of the soldiers, but we do wish that there might be some effective way of getting teachers to use the same skill and care in trying to "reach their audiences" as were necessary with those teachers and lecturers who had soldiers for students.

To believe rigidly in cause and effect is to be a philosopher. To act rigidly upon the belief is to be an artist.—*C. Hanford Henderson.*

Eternal progress is the law of nature. No matter how battered and blood-stained the traveler may be, or how low down in the Valley of Despair, above and beyond are the everlasting mountains, their crystal summits towering to the blue heavens and beckoning upward and onward. He shall hear their call, and rising with renewed strength surmount all obstacles and achieve final victory.—*A. S. Ames.*

Little Arguments on Great Principles

FRENCH vs. COLLEGE FRENCH

"Ah, *bon jour,* my dear friend Trysquare!" exclaimed a familiar voice from a strange-appearing, but handsome figure dressed in a snappy, regulation French uniform.

"Well, upon my word, if it isn't Frills!" said Trysquare, himself a captain of engineers, just back from across. "In uniform! A *French* one, at that!"

The two shook hands rapturously and began a rapid fire conversation concerning all the strange and tragic and marvelous happenings in the two years since they had separated.

"And what was your line?" inquired Trysquare, scrutinizing his friend's insignia with a kind of puzzled expression on his face.

"*Camoufleur,*" replied Frills with enthusiasm. "I joined up with the French immediately after the sinking of the Lusitania."

"Fine!" said Trysquare, as he gave one of his frame-shaking slaps on the shoulder. "Same old line; didn't have to change your occupation at all. You just went right on at your accustomed task of emphasizing the misleading, thinking of the intangible, and always trying to make things seem what they are not."

"Ah, the same old rigid, inflexible Trysquare," Frills replied, and then added with conviction, "Yes, I presume it's a part of the artist's mission to put new meaning into the sordid, commonplace things of life. But what were your duties in France, may I ask?"

With justifiable pride, Trysquare pronounced the single word, "Engineer," and then after a pause, continued, "Getting right down to real earth, building bridges and laying railroads up to the front to carry real men and ammunition and food and guns to meet a real enemy and to face things as they are—"

"Protected all the time," broke in Frills, "by the *Camoufleurs* who directed the enemy's shot and shell far away from you and your tasks by the artist's 'intangible things that are not'."

"Oh, well, 'as you were,' laughed Trysquare, "but what fronts were you on?"

"Ip-Eep-Ypr-Wipers, or whatever you call it, and Cawn-Kin-Cantigna, or whatever it is," stammered Frills.

"Ypres and Cantigny," Trysquare volunteered in real Frenchy French.

"Yes, yes," assented Frills, just a bit annoyed, "I never shall be able to speak French in that peculiar French way; it's so different from the college French I had."

"Yes," languidly answered Trysquare in a tone of mock anxiety, "I think our colleges should start courses in American College French for the French people. How much French did you have in college?"

"Three years," boasted Frills, "and I fancy I was about the star of the class. But in France, I was helpless. When I ordered eggs, I was more likely to get pigs' feet or marmalade. Of course, I took college French for cultural purposes. I never thought of using it. Did you have French in college?"

"No," almost boastingly answered Trysquare, "I had a three months' evening course in a camp Y. M. C. A. hut, before we went over. I wanted to *use* it and I had a teacher who knew how to speak French and how to teach it."

"And you could use your French in France?" asked Frills in surprise.

"*Oui,*" responded Trysquare with a twinkle in his eye, "*j'ai appris à parler et à lire facilement là langue Française. Lorsque j'étais en France, je causais toujours en Français. J'ai lu les livres Français, et je suis parvenu á connáitre les habitudes de ce peuple, à comprendre sa noble mentalité. J'ai appris à aimer sa vie et même sa langue. Aussi—*"

Frills threw up his hands and yelled, "*Cammerade! Naw cumprang!*"

"*Non comprend,* eh?" laughed Trysquare as he tauntingly chided Frills about his college French pronunciation.

"Well, as I said," retorted Frills, "I was concerned in college only with the cultural aspects of French. The sordid, mercenary, practical side of it never appealed to me. Besides, our professor had himself been taught in an American college, and I do not remember that he ever attempted to speak the language. He was concerned only with the cultural values of that beautiful, euphonious, even if somewhat nasal language."

"Indeed! It must have been charming to hear him and you and a score of others mangling that 'euphonious even if somewhat nasal language' with your parley vooing, naw cumpranging, and awe ravoring."

"I tell you," said Frills with some heat, "that we were not trying to get the use of the language for some practical end by wasting our time over the mere details of vocabularies, pronunciation, and idioms of the French language; we were interested in refinement, culture, the spirit of the language and the people—in other words, we were seeking life instead of mere details of language."

"Let us assume that you were seeking all those intangible things. Do you think you got them?" inquired Trysquare.

"I trust that we did!" answered Frills uneasily.

"Well," persisted Trysquare, "in a few months I learned to read and to speak French with considerable ease. While in France, as I said a moment ago in French, which you couldn't understand, I conversed with the French people on the various topics of common interest. I read their books, came to know their customs, understood their fine spirit, and came to love both their life and their language. After three years of study, you went to France, and you admit that you could not use the language you had been studying all thru college. Now tell me what it was that *you* got out of your study of French that *I didn't* get."

"My dear Trysquare," said Frills condescendingly, "you don't seem to realize that there are things in life that can not be measured with the carpenter's square; there are values that cannot be wrought with anvil and hammer; there are depths that the—"

"—plumber's plumb cannot plumb," interrupted Trysquare, "and there are simple little things that an American college French student cannot say to a Frenchman in French. Now you listen to me lecture for a while. I'm never going to admit that French mouthed over and played with in a wooden, stilted college fashion will give culture, but when actually mastered as a language and as a vehicle of important, useful, and necessary thought it becomes only a sordid, mercenary, practical tool without the values of culture and refinement. My theory is that whether it be French, dancing, farming, or dentistry, a job mastered is just as cultural as a smattering of it under a high sounding title, and I think it's much more so. When I've stumbled around over a language or a job for two or three years and cannot use the language or do the job, I'm not going to kid myself into believing that I have reaped some marvelous and mystic influence. I'm going to believe that I have failed and that the teacher didn't know his business."

"My dear Trysquare, you fail to understand that indefinable, intangible, mysterious something which we call culture. I shall now proceed to enlighten you on that topic; but, ah, tut, tut, we've gone far beyond the limits of our page."

"Awe ravore," said Trysquare tauntingly in typical college French, *"Awe ravore."*

ART AND THE DAILY LIFE OF MAN.

If you accept art, it must be a part of your daily lives, and the daily life of every man. It will be with us wherever we go, in the ancient city full of traditions of past time, in the newly cleared farm in America or the colonies, where no man has dwelt for generations to gather round him; in the quiet countryside as in the busy town, no place shall be without it. You will have it with you in your sorrow as in your joy, in your work-a-day hours as in your leisure. It will be no respector of persons, but be shared by gentle and simple, learned and unlearned, and be as a language that all can understand. It will not hinder any work that is necessary to the life of man at the best, but it will destroy all degrading toil, all enervating luxury, all foppish frivolity. It will be the deadly foe of ignorance, dishonesty and tyranny, and will foster good-will, fair dealing and confidence between man and man. It will teach you to respect the highest intellect with a manly reverence, but not to despise any man who does not pretend to be what he is not.—*William Morris.*

SUBTRACT hard work from life, and in a few months it will have all gone to pieces. Labor, next to the grace of God in the heart, is the greatest promoter of morality, the greatest power for civilization.—*S. C. Armstrong.*

No man is born into the world, whose work
Is not born with him; there is always work,
And tools to work withal, for those who will;
And blessed are the horny hands of toil.—*Lowell.*

WASH DRESSES DESIGNED AND MADE BY STUDENTS IN THE KENOSHA, WIS., HIGH SCHOOL.

THE POSSIBILITIES OF PATTERN-MAKING COURSE IN THE HIGH SCHOOL

E. C. Hanley, Muskegon, Mich.

(Conclusion)

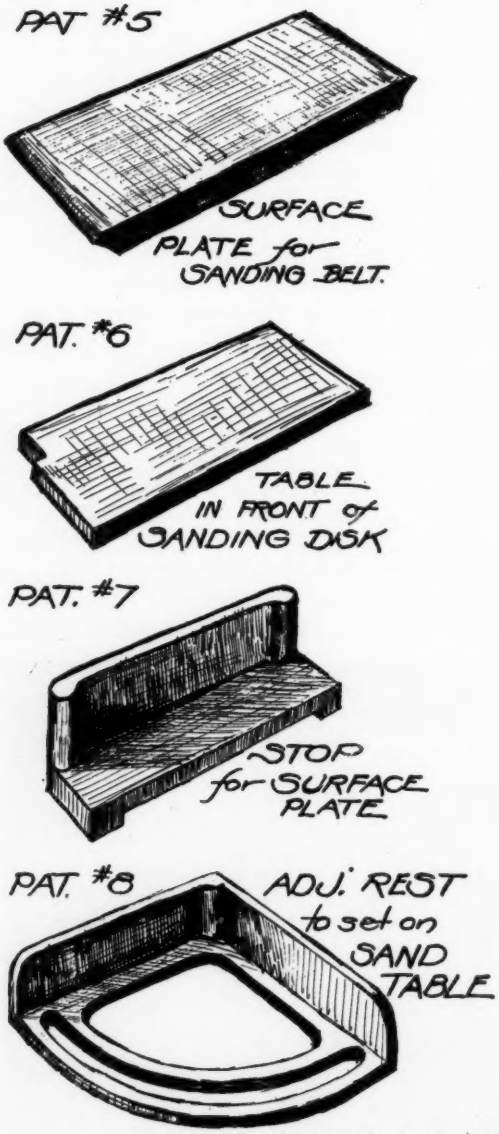
Fifth Week. New Project: "Surface Plate".

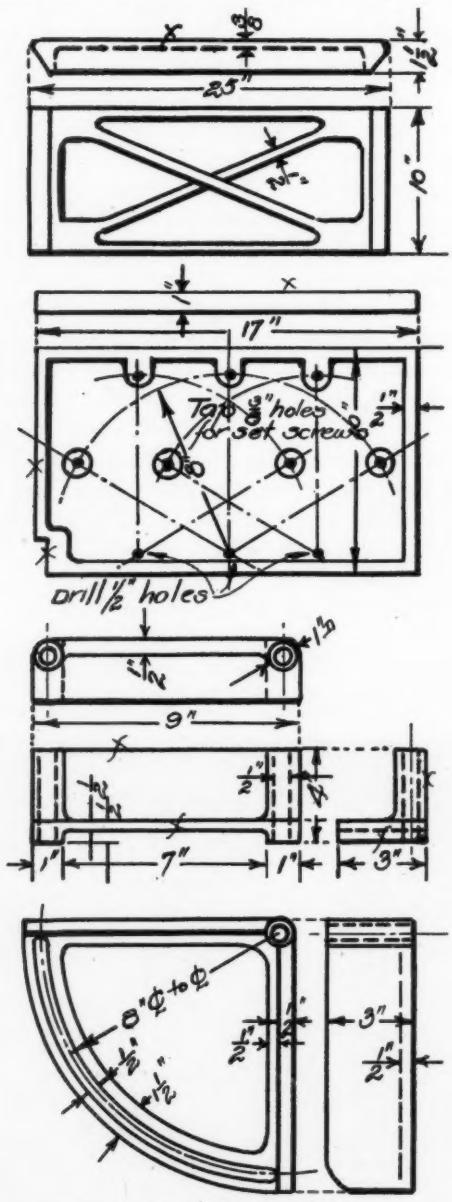
Laying out a ribbed pattern.

A study of clean and dirty castings. Various styles of gates that are used in molding and the principal involved in stopping the slag from entering the mold; application of a core in the gate and a core drain in the sprue hole. Making a pouring basin. Helping overcome shrinkage in a casting by keeping the metal in the riser open with a feeding rod. Application of "titanium" and aluminum as a means of cleansing hot iron of minute particles of dirt and slag that do not offer to float on top of the metal. Application of chills in a mold to help overcome shrinkage. Coating the chill with kerosene to stop the chill from adhering to the casting. Coping the surface plate to allow the top side of the casting to receive the cream of the hot iron. Use of "gaggers" and "soldiers" and clay wash as a binder in coping the pattern.

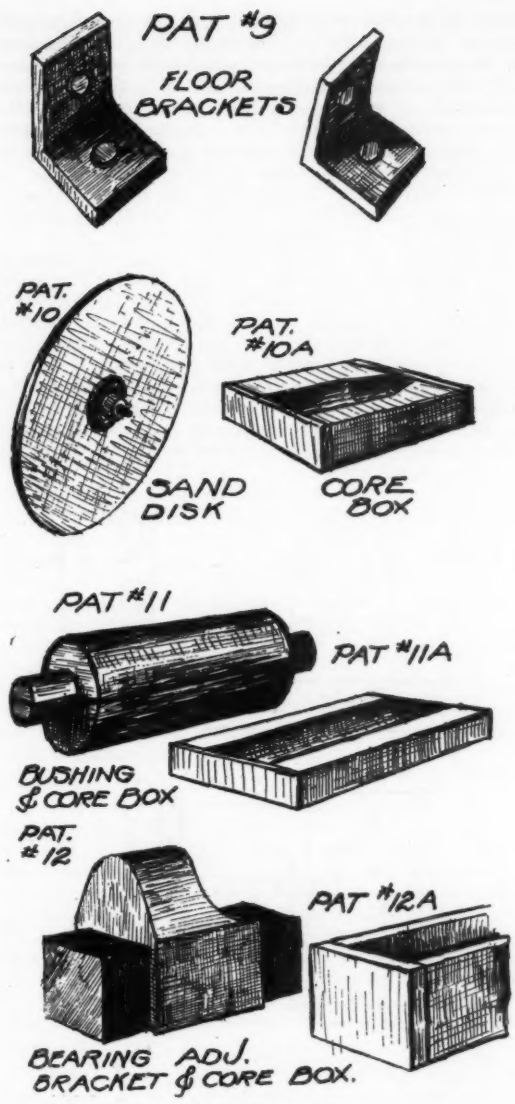
Sixth Week. New Project: "Sanding Table".

A study of the cupola. Its general construction:—the air chamber, the tuyeres, lining the fire brick, glazing the lining with a wash of fire clay and slight addition of salt. Making the breast works and lining the spout, baking the breast works and the spout. Making the bed. Kindling the fire. Throwing on the coke and charging the load. Estimating the weight of a layer of coke to melt a given amount of iron. Addition of a small amount of limestone or oyster shells as a flux to aid the carrying

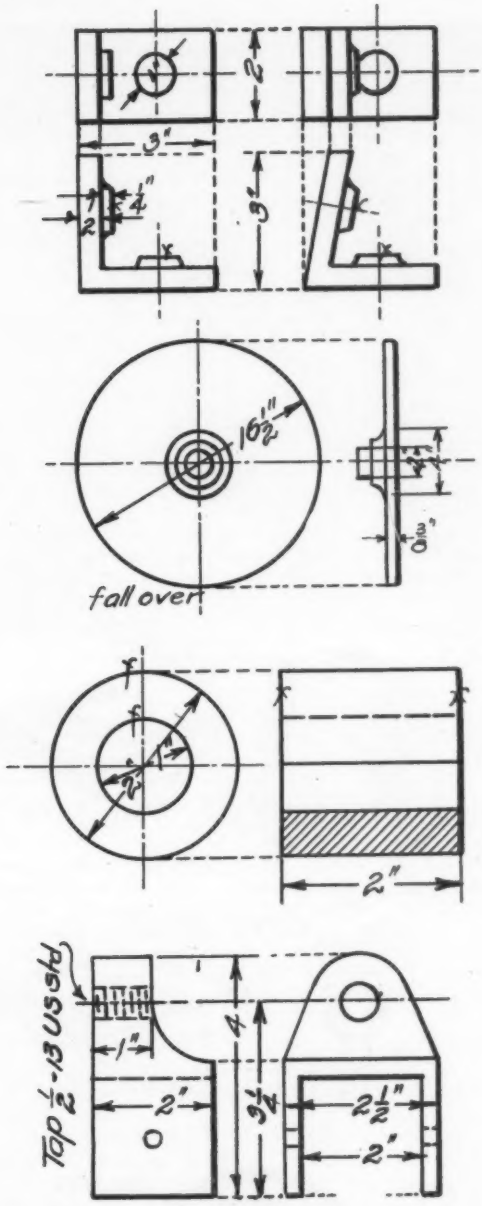




Patterns 5-8. (An assembly drawing and Patterns 1-7 appeared in the October Magazine.)



Patterns Nos. 9 to 12.



off of the slag. Location of the slag hole on the cupola. Use of fire clay and a small amount of sawdust as a practical mixture for the bod. Coating the bod with flour as a means of preventing the bod from sticking to the breast opening. Cementing the bod to the rod with clay wash. Lining the pots with fire clay. Kindling, drying and heating the pot before receiving the hot iron. Starting the fire in the cupola. Time for the blast, carrying off a heat and dropping the bottom. Instruments for measuring the blast.

Seventh Week. New Project: "The Sanding Stop".

A study of the Brass Furnace. The pit, the grates, natural draft, applying the coke, packing the pot, etc. See Industrial Arts Magazine, March, 1919, page 88. The crucible, its composition, tempering, care and abuse. Compositions of brass for various uses. Protecting the zinc from passing out of the mixture as fumes, by covering the metal in the pot with charcoal. Flour as a facing for brass.

Eighth Week. New Project: "Sanding Disc Table Guide".

An elementary study in shop methods. Recording and storing of patterns. Card systems. Figuring shop costs and overhead expense. Estimating the selling costs. Estimating the weight of castings from the patterns.

Ninth Week. New Project: "Floor Brackets".

Constructing a pattern with loose pieces. Methods of holding these pieces in the mold while molding, with the aid of pins, dovetail attachments, etc. Coaxing out the loose pieces after the pattern has been molded. Use for bosses on a casting. Cleaning the castings in a foundry. Various styles of rattlers. Use of stars in cleaning iron castings. Use of running water and sand in the rattler in cleaning brass castings. Determining the strength and properties of metal castings. The need for test lugs on a casting in such cases. Test bars.

Tenth Week. New Project: "The Sanding Disk".

The wood turning lathe, its various parts and their uses, care and abuse. Names of the various turning tools and their general uses. Grinding and sharpening the wood turning tools, using the slip stone on the gouge. CORE PRINTS and the part they play on the pattern. Their relation to the core and core box. Distinguishing

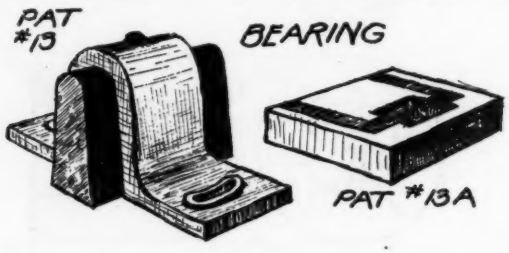
the core print on a pattern. Designating the shape of the core on the pattern. Constructing a simple symmetrical core box. Constructing a symmetrical core in two halves. Types of core sand. Use of boiled linseed oil, molasses water, glucose, etc., as a binder for cores. Core plates. Determining by the color when a core is baked. Danger of over baking a core.

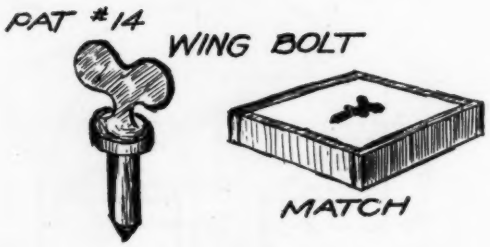
Applying batten boards to the pattern to prevent warping and to also hold the pattern perfectly flat in the mold during the process of molding. Filling in the recesses in the mold after the pattern has been withdrawn from the sand.

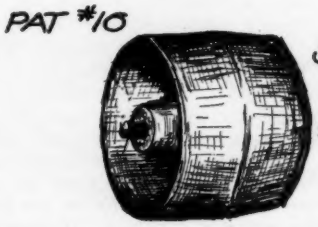
Eleventh Week. New Project: "Bushing".

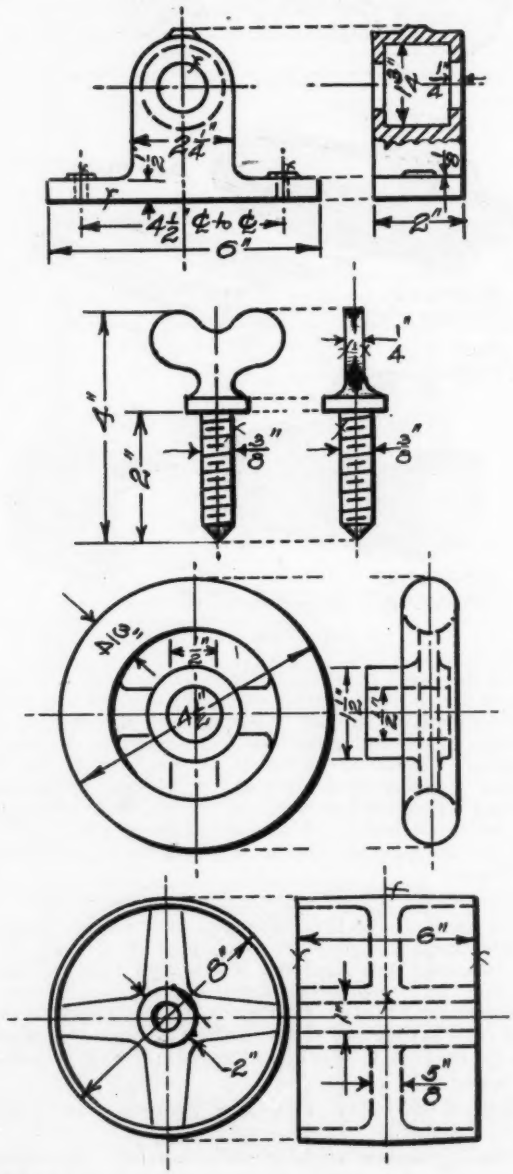
In offering to the student the bushing we must not overlook the fact that in its construction are offered some of the most important principles used in pattern making. The important need of building a pattern such as the bushing might best be impressed upon the mind of the boy by first molding the pattern as a solid piece. At the same time it is well to impress upon the student the fact that the pattern may be used to advantage in the foundry as a solid piece when used in connection with a "match" or "follow board".

Demonstration of the various ways of locating for the dowel pins on a split pattern such as the impression from the head of two or more brads when squeezed between two pieces of wood. Boring the hole from the outside of the pattern passing thru both pieces and treating them as tho they were but one block, filling in with dowel rod the unnecessary hole on the outside of the pattern before the pattern is completed. Locating the centers for the dowels by means of center lines and knife lines squared across both pieces. The important part the knife lines play at this time, leaving as it does a scar on the work appearing at all times between the halves of the pattern thus insuring the workman the exact location of the concealed dowels during the time the pattern is being turned up. Use of corrugated nails, screws, pinch dogs, paper and glue as a means of holding the two halves together the process of turning. Other uses for pinch dogs as clamps for irregular patterns while in the process of gluing, etc.; for example an irregular pipe bend. Various styles of metal dowels and their application. Advantages of brass dowels as compared with iron ones. Horizontal core prints as compared with vertical ones. Determining the length of a core print. Constructing a symmetrical core box using the core box plane as a finishing tool. Setting and grinding the blade on one of these planes.









Patterns No. 13-16

Opportunities that the circular saw offers in cutting out a symmetrical core box. Painting the core box. Reinforcing the core to be baked with wires, iron rods, screw, nails, etc. Venting the core using a vent wire. Use of wax strips as a means of forming veins that melt out during the process of baking.

Twelfth Week. New Project: "Sliding Bracket".

Building up a square core box. Building the box in parts to simplify the removing of the core.

Chaplets—their use as a means of holding down a core that is not self supporting in a mold. Various styles of chaplets. The evil side of the chaplet: breaking the uniformity of the casting at this point, cause of blow holes. Chaplets work loose in the casting thus leaving holes. Overcoming this evil in the construction such as corrugations, tapers, etc. Danger of rust on chaplets as it is a serious means of generating gas in the mold at the time of pouring. Coating chaplets as a protection in this case.

Thirteenth Week. New Project: "Bearing".

Use of the "D" Core Print in simplifying the introduction of a core in an out-of-the-way place. Building a core without the corresponding lug to the D core prints by the use of a molder's shingle after the core has been placed in the mold. Discussion of other types of core prints. The BALANCED CORE PRINT as used in the case of cores that are dependent upon only one end of the core for support. Need for oversize cores so as to be pinched in the mold, in such cases; additional use of nails at this time in pinning down the core.

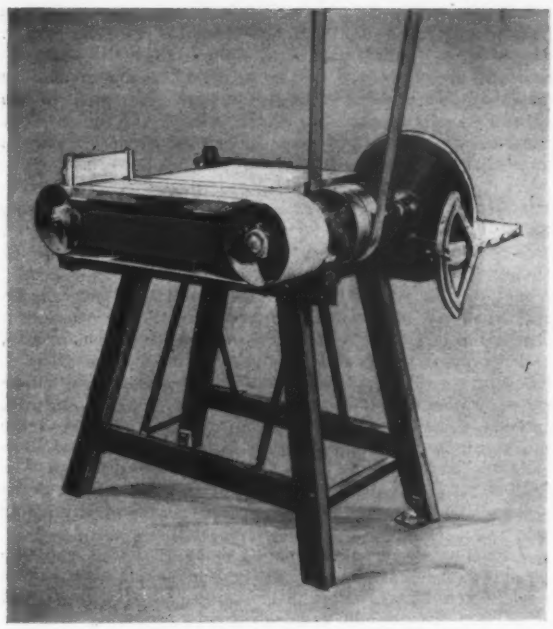
Bearings. Application of babbit, housing the bearing with clay before pouring babbit. Building a split bearing. Advantage of a split bearing. Shims and scraping tools in adjusting a bearing.

Fourteenth Week. New Project: "The Wing Bolt".

Building a one piece pattern part made on the lathe, part accomplished on the band saw and last to be finished by hand. Further instruction on a "MATCH". Building the frame or box. Introduction of numerous nails driven into the wall to catch the bed. Plaster of Paris, boiled oil and sand, and other mixtures in the making of the match. Molding the pattern up to the time the cope is about to be placed, then placing the frame for the match, adding the mixture, placing the bottom board; after the match has hardened removing of the box. Building matches out of wood and metal where they are to be used continuously.

Fifteenth Week. New Project: "Hand Wheel".

Building up a pattern from several pieces of wood. Laying out, on a wood disk attached to a face plate, inside and outside diameters of the rim. Dividing into sections, fitting segments to the sections, holding temporarily in place with brads. Gluing and clamping the segments, overlapping the segments of the second layer on the joints of the first layer, to give the rim strength. Avoiding end grain on a built up pattern. Working up the



THE COMPLETED SANDER.

spokes and hubs to advantage at the same time the rim is being built. Turning up the rim, need for a template. Turning up the opposite side of the rim by means of chucking. Fastening the spokes to a disk; gluing on the hub. Turning down the hub and the ends of the spokes to fit the rim. Reversing the spokes and hub for the addition of a hub on the other side. Removing from the face plate, shaping the spokes and fastening to the rim. Other methods of attaching the spokes. Making recesses in the middle layer of the rim to receive the ends of the spokes separating the next layer with glue and paper to allow for the parting of the rim at the time of the insertion of the spokes. Additional opportunities for demonstration on the use of a match.

Sixteenth Week. New Project: "Pulley Wheels".

Continued work in built up patterns.

Standard core prints and hubs as used in the commercial shops.

In addition to the 8"x6" pulleys as shown in the series of working drawings, a similar pattern for an 8"x2" pulley will be needed to produce the two pulleys that are to drive the machine and take care of the belt when the machine is running idle.

PRINTING IN CALIFORNIA SCHOOLS

Altho printing is almost the newest of the school instruments of education, it is rendering a splendid service vocationally, culturally and for social purposes, according to a study of the subject which has just been made in California by Prof. R. G. Boone, of the University of California. Twenty-eight schools in the state of California offer courses in printing and as a result of a questionnaire sent out by Dr. Boone, 25 schools reported to him on the purposes of instruction, educational values of the work, and details of courses, equipment, etc. Twelve of these schools were high schools, three intermediate schools, two normal schools, three were technical schools four were corrective institutions and one a school for the deaf. Twenty of the schools offered instruction in a print shop. The study showed that less than six of the schools have fixed courses of study in printing. The remainder are following courses which are in process of development as opportunities present themselves for teaching and use of printing.

School Printing Equipment.

Dr. Boone found it difficult to estimate the value of the shop equipment for printing in the twenty schools. Sixteen of the schools show an aggregate investment of nearly $60,000 varying from a few hundred to more than $10,000 but these figures are not comprehensive because the equipment in some of the schools was obtained second-hand and would have cost far more if they had been bought direct from the manufacturers. A few of the schools have very complete equipments even to the inclusion of typesetting machines and cylinder presses, while others have very small outfits of type, a platen press and

a few accessories. The average investment per school is probably $3,000 and four schools report less than $1,000. The upkeep of the school print shop is relatively inexpensive and the first cost may be adjusted to the immediate needs of the school. The amount of, and cost, of the plant depends on the size of the school and the product contemplated. No proposed school print shop need be imperiled by excessive initial expense.

Products of School Shops.

Discussing the products of the school shops, Dr. Boone says: "These are varied and suggestive of the manifold uses to which a school printing plant may be put. They include, first of all, the satisfaction of the school needs; school stationery, (some very fine samples of letter heads and envelopes are shown); entertainment literature, programs, notices, tickets, etc.; reading lessons for the grades, and literature studies of the high school; syllabi outlines, laboratory guides; progressive directions for special supervisors; school songs, drawing instruction, physical training exercises; class and school bulletins; reference aids to the course of study,—supplementary material, bibliographies, collateral assignments, hints for original studies, etc. The field is extensive, and productive of rich returns of cultivation. The school print shop creates a greater volume of printing."

During the war the print shops rendered valuable service in promoting community and social war service work. Red Cross, community center, Liberty Loan and other war propaganda were effectively promoted thru the printing contributed by the school shops.

School papers are produced by a majority of the California school shops. On this point Dr. Boone writes: "Practically all the schools that maintain printing plants, publish their own papers; sometimes weekly, sometimes monthly, occasionally only a term or annual issue. They may take the form of occasional or periodical bulletins, or letters, as the means of intercourse between the school and the homes; chronicles of the school's doings,—sports, courses of lectures, parents' meetings, articles contributed by students or faculty or patrons, news and letters from alumni.

"Several of these are worth while journals to others than the immediate constituency. Whittier publishes both "The Sentinel", the school paper, and "The Journal of Delinquency"; the San Diego High School issues, regularly, three publications,—the High School Manual and the Junior College Manual, (both annuals), and a high school paper, "The Russ"; the State School for the Deaf, "The California News"; the Los Angeles Manual Arts, "The Artisan", (a 200 page semi-annual class year book), and a school weekly; the California George, Jr. Republic (Chino), two papers, "The Weekly Index", and the "Junior Republic" (a monthly); Pasadena issues the "High School Item", a 6-page journal; Pomona, "Ye Chronicle", a weekly; the Edison Intermediate School, Berkeley, "The Mazda" (very appropriate); Stockton, for the Evening School, "After Dark"; the Frances W. Parker School, San Diego, "The Parker Post"; The Lincoln High School, (Los Angeles), "The Railsplitter"; Ukiah, "The Ukiahi". Beside these, Coalinga, Santa Barbara, and Santa Cruz high schools, and the San Jose Normal all publish similar papers.

"Most reports mention the fact that 'the entire responsibility for getting out the paper—composition, typing, making up forms, proofing, printing, binding, rests with pupils.' It is claimed that in no other department of any school are there afforded such opportunities for the exercise of deliberative thinking and planning, for discriminating judgment, and ideals of achievement. It is an honorable showing, and dignifies the uses of the school printing plant. However, it should not be forgotten that the primary purpose of installing printing is for educational ends, and that product should not be considered."

Purposes of School Printing.

With two exceptions, the purpose of printing in the California schools is educational. In one school the work is said to be frankly commercial and in the Preston School it is claimed to be entirely for trade training. In the Los Angeles Manual Arts High School the purpose is largely vocational, partly social, and prevocational. The school shop does printing for the entire school and the students may be engaged directly in trade training or may take the work as a means of finding themselves. These three purposes seem to be involved in practically all of the courses of various schools. In the Junior High Schools and grade schools, the work is, however, educational in large part. "It supplements and makes practical the usual English exercises, compels accuracy and alertness, stimulates to originality and effectiveness of expression, and appreciation of form and arrangement in composition." San Jose thinks it an effective means of arousing interest in otherwise unattractive exercises, and makes possible a stimulating and sound correlation of most academic subjects. There is noted, too, the sense of reality and completeness, in "the finished job," the adjustment of means to self-conceived ends, resourcefulness in artistic designs and in mechanical and reflective organization of one's material.

"But, with two exceptions, the vocational or industrial, or career meanings of the shop experience are recognized. A dozen schools see it as one of the aims of the course to prepare for one or another phase of the printing craft,—journalism, newspaper reporting, machine operating, typesetting, foremanship, etc. Nine report having sent boys into the trade who, according to the length of their training, received credit on the apprenticeship requirements. Very properly, too, the amount of this credit will depend, in part, on the emphasis given to the shop training, the maturity of the candidate, and the nature of the school course."

The Courses.

The courses offered vary considerably, depending on the school, the equipment, etc. Most of the courses are tentative and grow or change with each successive class. The work varies in length from one to four years. In the Los Angeles Manual Arts School, the course is four years but the student may take only one semester of work as a try-out. In the Oakland Vocational School there is a four-year practical course, with trade applications of English, history, mathematics, science, etc. Other classes do not use a formal course.

Speaking of the purpose of printing from the curriculum standpoint, Dr. Boone says: "It will be apparent that school printing is either, or maybe both, a practical and a fine art; *practical,* as it looks to the skillful handling of materials, the pragmatic purpose and economic assurance; a *fine art,* in a growing recognition and appreciation of the exacting niceties of the processes, and the fitness in page and distribution of matter. As a practical art it is a form or modification of apprenticeship; it tends to become distinctly trade training, or a conscious preparation for it, employs and studies a practical technique and looks toward skill—skill of commercial standards and values, with apprenticeship credit as the goal. As a manifestation of fine art, it aims at breadth of training, the rationale of the art and the social and economic, the aesthetic and human meanings of the industry.

"With this fine art reference in mind, it will be seen that the inclusive school in which printing is in intimate association and constant reaction with other, and especially academic subjects, is much to be preferred for educational purposes. The specialized school is likely to be more narrowly but more assuredly practical, and directly promotive of trade recognition. So far, in California school print shops, the liberalizing, handcraft, creative, human, educative purposes have been predominant."

Discussing finally the value of printing, Dr. Boone remarks that it is not likely that the school print shops can turn out a product in the form of trained printers who will be in large demand and therefore the school shops will not be much of an instrument for vocational

training alone. "But, not less in California than elsewhere," he says, "Such schools, and all classes in both junior and senior high schools, will find it one of the most effective means of stimulating vital reactions in the learner, the motivating of exercises in language and other forms of expression, and in an appreciation of the fineness of discriminative thinking and aesthetic satisfactions. The primary aim of schooling is education; not mere training. And to this end, printing may well take its place along with other constructive exercises, as yielding insights, and a sense of achievement, that are of the essence of effective education. The shop, any shop, is an educational opportunity; not the least, by any means, the print shop."

In Mr. Boone's final summary, he suggests that one of the vocational purposes of printing will be the preparation of teachers of printing who will carry on the present work into the high schools of the future.

ARRANGE EXHIBITS.

Under the direction of Mr. F. W. Brackett, Director of Manual Arts, a series of loan exhibits has been arranged at the Greenwich high school, Greenwich, Conn. The exhibits will consist of loans, of drawings, paintings, carvings and other art work by various artists who live and work in the city of Greenwich and in the surrounding country. The following program will give a clue to the inclusive character of the exhibits:

September—Work of Clarence H. Rowe, Illustrator: Original drawings for book illustrations.

October—Work of Leonard Ochtman, Artist: Original oil and water color paintings.

November—Work of Mina Fonda Ochtman, Artist: Original water color paintings.

December—Work of A. J. Norris, Decorator: Original drawings for interiors, original modelings for interiors, original carvings from modelings.

January—A collection of original drawings and paintings for book and magazine by various popular artists, loaned by Chas. Scribners' Sons, Publishers.

February—Work of George Wharton Edwards, Artist: Original drawings and paintings to illustrate the use of various media, oil, pastel, crayon, water color, pencil and tempera combined, etc.

March—Work of Elmer Livingston MacRae, Artist: Original decorations.

April—Work of H. C. Murphy, Jr., Artist: Original oil and water color paintings.

May—Another collection of original work with reproductions of same, loaned by Chas. Scribners' Sons, Publishers.

June—Work of the various high school classes.

Mr. Brackett believes that this form of exhibit which illustrates the particular work of successful men in various fields of art effort offer the students of the school an unusual opportunity of studying style, composition, technique and color under the most beneficial conditions.

GUSTAF LARSSON—AN APPRECIATION.

By Josef Sandberg.

Mr. Gustaf Larsson was one of the pioneers of Manual Training in this country, and thru his death on July 23, 1919, the cause has lost one of its most enthusiastic advocates.

Born in Sweden fifty-eight years ago, December 10, 1861, he became interested at an early age in this work. After completing his elementary education he entered a technical school, going from there to the Normal School at Naas. He gained shop experience as a Cabinet-Maker in Stockholm and after a short period as an instructor returned to Naas as a teacher under Dr. Salomon.

Thirty years ago he came to this country for the purpose of introducing Sloyd—the Swedish system of Manual Training—into the schools here. Others had attempted this before him and failed because they did not adapt the work to American conditions.

Mr. Larsson succeeded in interesting several influential people, among them the well known philanthropist, Mrs. Quincy A. Shaw.

Thru her interest and generosity the Sloyd Training School was established in 1888 with Mr. Larsson as principal.

Filled with enthusiasm and belief in the educational value of the subject he started his training of teachers, a work which he continued until his death.

Mr. Larsson's ambition was to send out graduates who were not only masters of their subject, and the art of teaching, but who also understood boy nature and would consider the boy and his development as of first importance rather than the object to be made.

His favorite definition of Sloyd was: "Sloyd is Tool work so arranged as to stimulate and promote vigorous, intelligent self-activity for a purpose which the worker recognizes as good."

He believed that Manual Training was one of the most effective agents in general education, and that vigorous tool work, properly motivated and directed, develops character.

He laid great emphasis on the fact that the object made should be useful and should appeal to the boy, and he demonstrated the fact that it was quite possible both to accomplish this and to arrange the work progressively.

By means of lectures and pamphlets Mr. Larsson aroused interest in Sloyd in various parts of the world. Pupils came to his school from Cuba and Mexico to prepare for teaching in those countries.

He conducted Model Classes at the Worlds' Fair in Chicago and in 1895 was invited to visit the Pacific Coast in the interest of the work there.

In 1907 the government of Myore, India, invited Mr. Larsson to conduct a teachers' training class there.

"The Schoolmaster", an English educational journal, in speaking of Mr. Larsson's work in India says that "Manual Training seems to acclimatize quickly in any region of the globe from China to Paris."

Mr. Larsson was a member of a number of educational societies and has published some books on the subject of Manual Training.

NEW FOREST SERVICE PHOTOGRAPH EXHIBITS.

New photographic exhibits on "Forestry and Nature Study" and "Farm Woodlands" may now be borrowed from the Forest Service, United States Department of Agriculture, Washington, D. C., by schools and libraries. The "Forestry and Nature Study" exhibit is a pictorial story of how trees grow, and of the buds, leaves, flowers, and fruits, the typical forms of trees, the different kinds of forests and the influences that affect their growth, and the enemies and friends of the forest. The "Farm Woodland" exhibit, which is especially adapted for use in agricultural and rural schools, shows different types of woodland, how the farmer can use the woodland and sell the product, and how trees make waste land profitable and help the farmer in other ways. The exhibits are made up in panel form, each panel consisting of four sepia enlargements.

Teachers of Manual Training and instructors in trade schools where carpentry and wood finishing are taught, will be interested especially in an exhibit of important woods in the United States which the Forest Service has prepared and which it will send out with explanatory charts and tables. The Forest Service also has extensive sets of lantern slides which will be sent out with outlines for lectures with many topics connected with forestry and the use of wood. These lectures will also be of interest to teachers of vocational agriculture under the terms of the Smith-Hughes law.

Lists of photographs, lantern slides and other exhibit material will be sent to any teacher of a school on application to the Forest Service Department, Washington, D. C.

PROBLEMS AND PROJECTS

WANTED: THE BEST OF PROBLEMS

What have been the most effective problems and projects made in your classes? Why have they been successful? In what way have they been best?

The Industrial-Arts Magazine is interested to learn what problems instructors consider their "best" and to publish a selection of those received in the Problems and Projects Department during the coming six months. For the "best" each month a check of $10 will be sent; for the second best, $7; and for all others, space rates will be paid. Problems will be judged on the basis of technical excellence, educational value, originality, utility, design, finish, beauty, economy. The editors of the Magazine will be the judges.

All problems submitted should consist of a black-and-white working drawing, or a tracing, a description of not more than 300 words, and if convenient, a photograph. The description should include a statement of the particular points which made the problem successful and such details as are needed to make the construction and finish of the article intelligible to shop teachers.

Problems in bench work, machine shop, patternmaking, cooking, sewing, millinery, forging, basketry, book binding, printing, leather work, pottery, cement work, cabinet making, woodworking, etc., are acceptable.

Problems may be submitted at any time up to December first, and any person may send as many as desired.

Address all correspondence to Managing Editor, **Industrial-Arts Magazine**, 129 Michigan Street, Milwaukee, Wis.

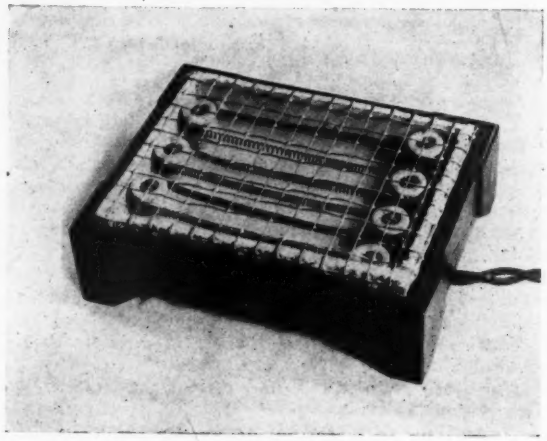
ELECTRIC TOASTER.
By W. R. Harwood, Salt Lake, Utah.

We think that no one will question the advisability of doing some electrical work in the elementary Industrial Arts course. The problem has been to find some suitable model, one that can be made in the ordinary wood working shop and yet worth the making, a project whose working principle the boy can understand and still learn some of the fundamental laws of electricity.

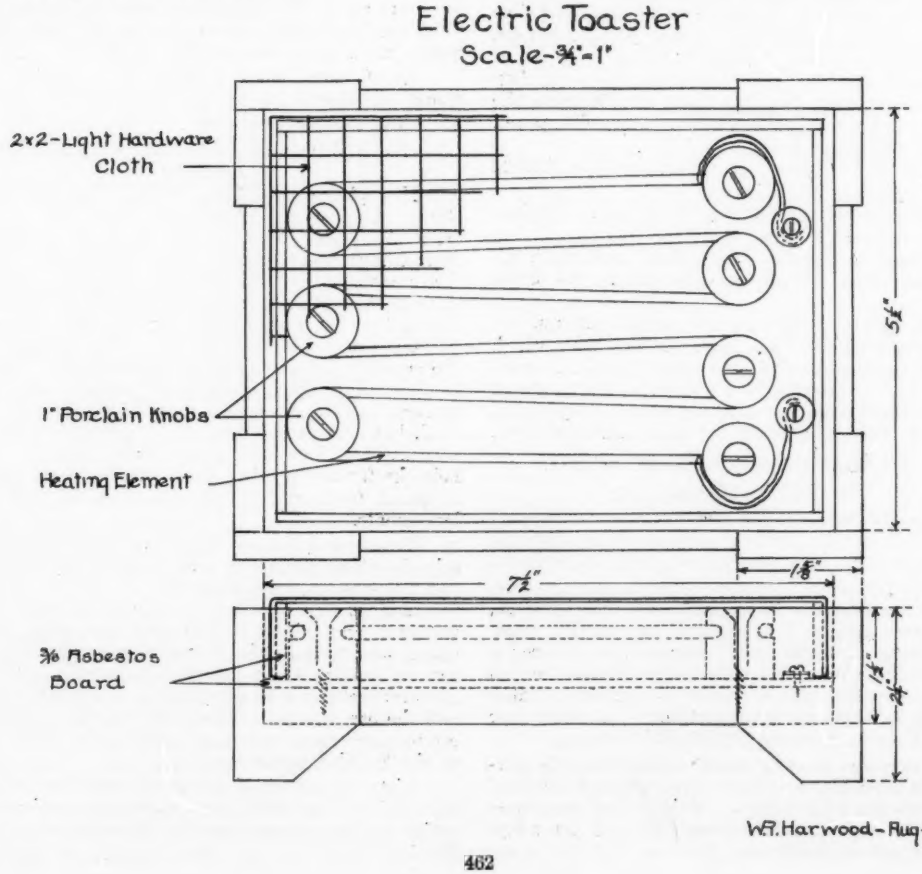
The simple electric toaster here described can be made in the seventh or eighth grade where the boys, besides making the toaster, are required to learn something of the uses and history of electrical heating. This project also furnishes practice in the manipulation of a variety of materials.

List of materials:

1 pc. $5\frac{1}{2}$x$7\frac{1}{2}$x$\frac{1}{2}$ Poplar
1 pc. 32x$1\frac{1}{2}$x$\frac{3}{8}$ Oak
Box
$7\frac{3}{4}$" Porcelain Knobs
19' No. 21 Climax Wire
1 pc. 8"x10"x$\frac{3}{16}$" Asbestos Board
7 $1\frac{1}{2}$" F. H. Screws



THE COMPLETED TOASTER.



Heating Element
1 pc. 8″x10″—2x2 Hardware Cloth
Bread Rack
Drop Cord and Attachment Plug.

Directions for Making.

First make the box, cover the bottom with asbestos board, and fasten the knobs in place. Next make the heating element from Climax wire by winding it on rod of metal ⅛″ in diameter and fifteen inches long. To do this catch the rod together with the end of the wire in an ordinary brace. By holding the wire between blocks of wood in a vise the tension on it can be regulated. Now turn the brace so that the wire is wound on the rod in a tight coil, which when finished can be slipped off and stretched to the proper length to string between the knobs. Care must be taken in stretching the coil to make the air spaces between the loops of wire all the same size because if they are not, uneven heating will result. Now string this heating element on the knobs and connect each end to a binding post making sure to double the wire from the last knob to the binding post. This is done to avoid heating the connections.

The rack to hold the bread is made by cutting one inch squares out of the corners of the piece of hardware cloth and folding up so as to form a box or basket that will just fit down inside the wooden box. If one inch strips of asbestos are fastened around the inside of this basket they will protect the wood from burning as well as help to reflect the heat upward.

SKIRT GAGE.

Paul L. Cressman, Uniontown, Pa.

The skirt gage problem in its construction affords opportunity for the teaching of a great many tool processes at a very low cost and when complete is a useful project. Some boys wish to make it higher than ten inches to meet the demands of style. In many instances this project has served as a Xmas gift.

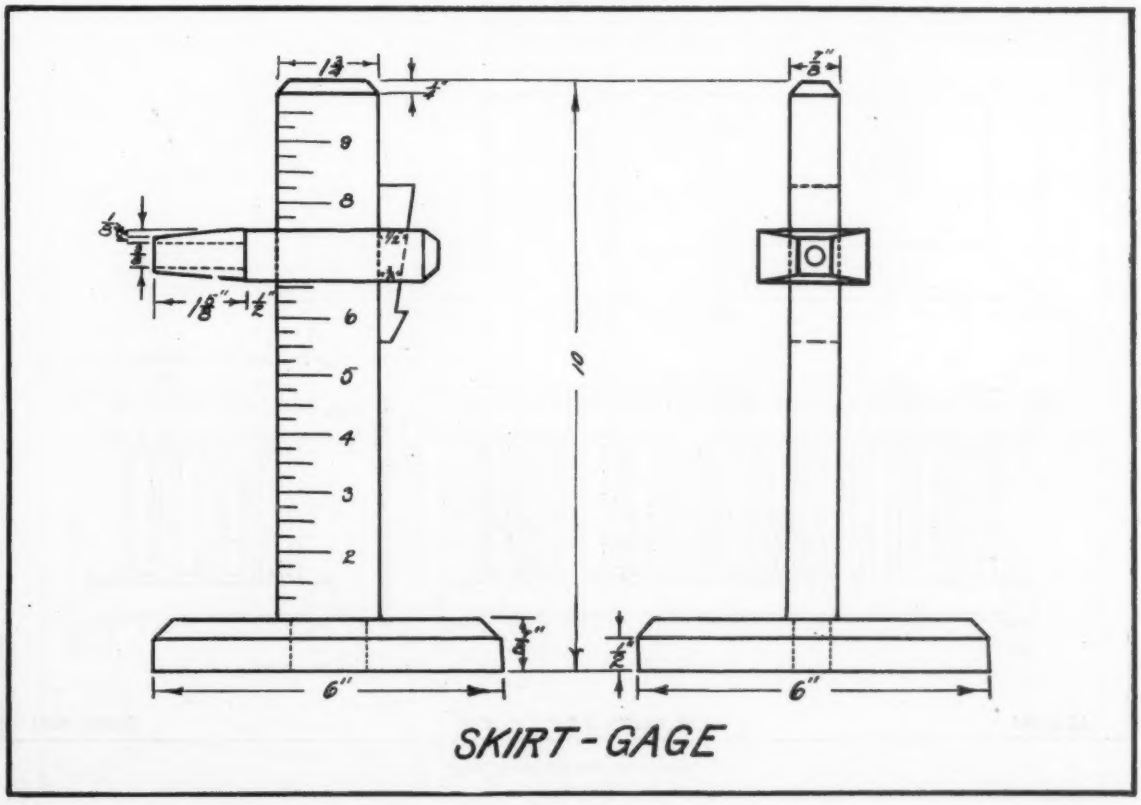
OAK CHEST. See Next Page.

A SHOP KINK.

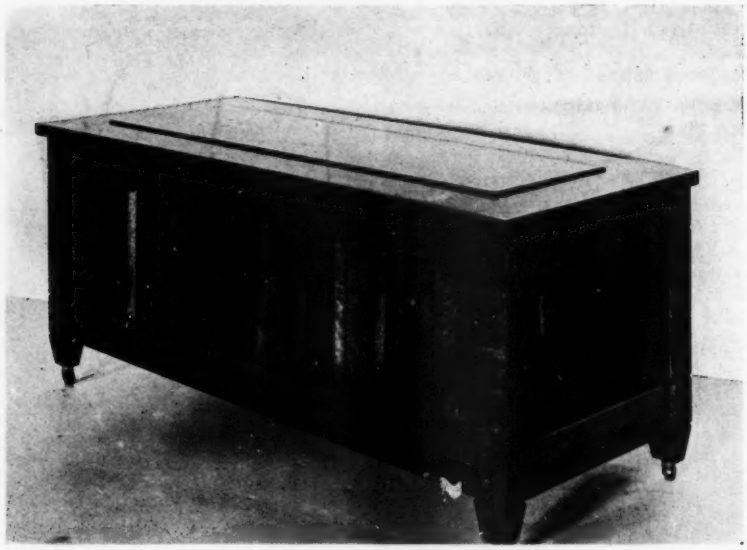
J. G. Schott, Supervisor of Manual Training, Aberdeen, S. D.

In trying to drive finishing nails into oak, the writer found recently that it is a very difficult task and requires a great deal of patience and a great many nails.

Finishing nails may be driven thru or into hardwood their entire length by first driving them thru a piece of pine or basswood. The nail is driven thru the softwood far enough so that the point projects and so that it may be placed where it is wanted. It is then driven into the hardwood. The extra stock can then be split with a chisel and mallet, whereupon the nail can be driven flush. By using scraps of lumber and wasting only about one-half inch of softwood for each nail, a great deal of patience and many nails are saved.



Details of Skirt Gage.



PANELED OAK CHEST.

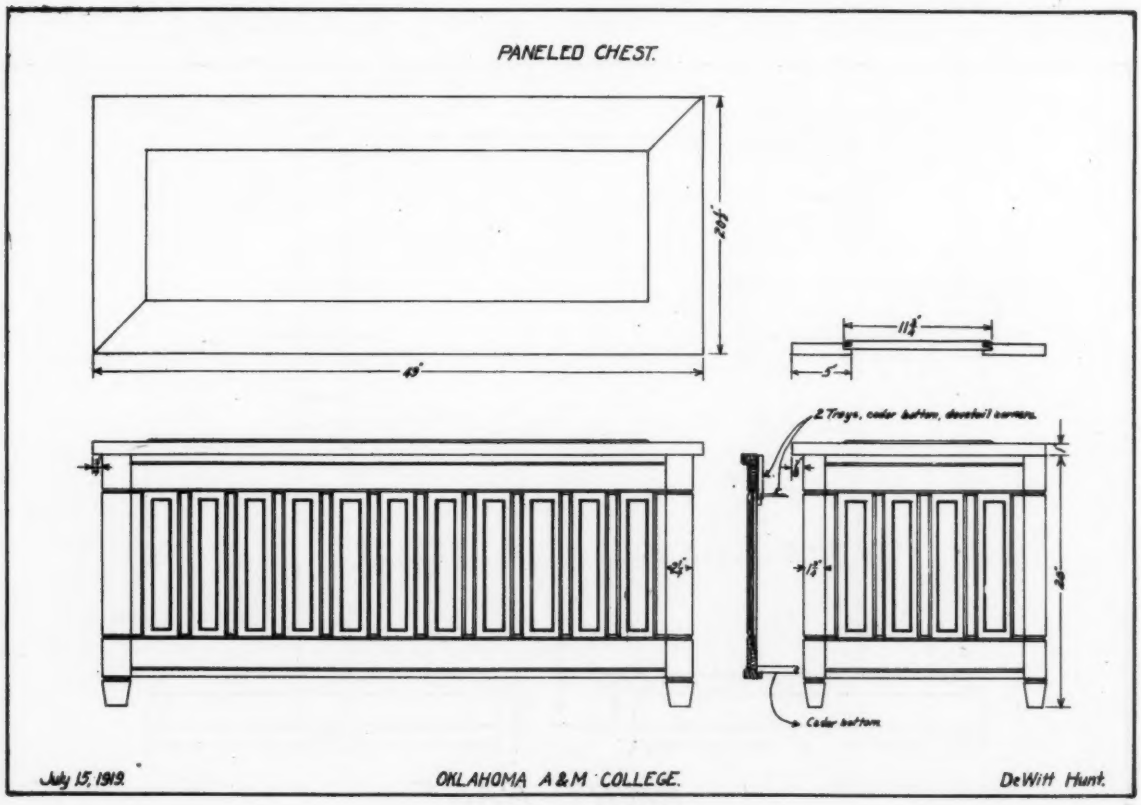
I remembered an old mechanical trick of driving a needle thru a penny by sticking it thru a large cork and giving it a sharp blow with the hammer after placing the cork on the penny.

A PANELED CHEST.

By De Witt Hunt.

The drawing on this page shows the details of a paneled chest which the writer made last winter after school hours. The panels are raised and free use is made of the chamfer as a decorative effect. The new and valuable thing in this chest is the design of the top. There is so much monotony to a large plain top and the liability to shrinkage and the possibility of the shrinkage resulting in warpage, led to a search for a design which would avoid these troubles. So the raised or exposed panel was the result of many days of study. This panel may shrink without spoiling the top; it cannot warp; the frame is mortised at each corner and the top is relieved of the monotony of broad surfaces.

The chest and trays are made of oak but cedar bottoms were put in both and tho the chest has been in use some time no moths have appeared in it.



Details of Paneled Oak Chest.

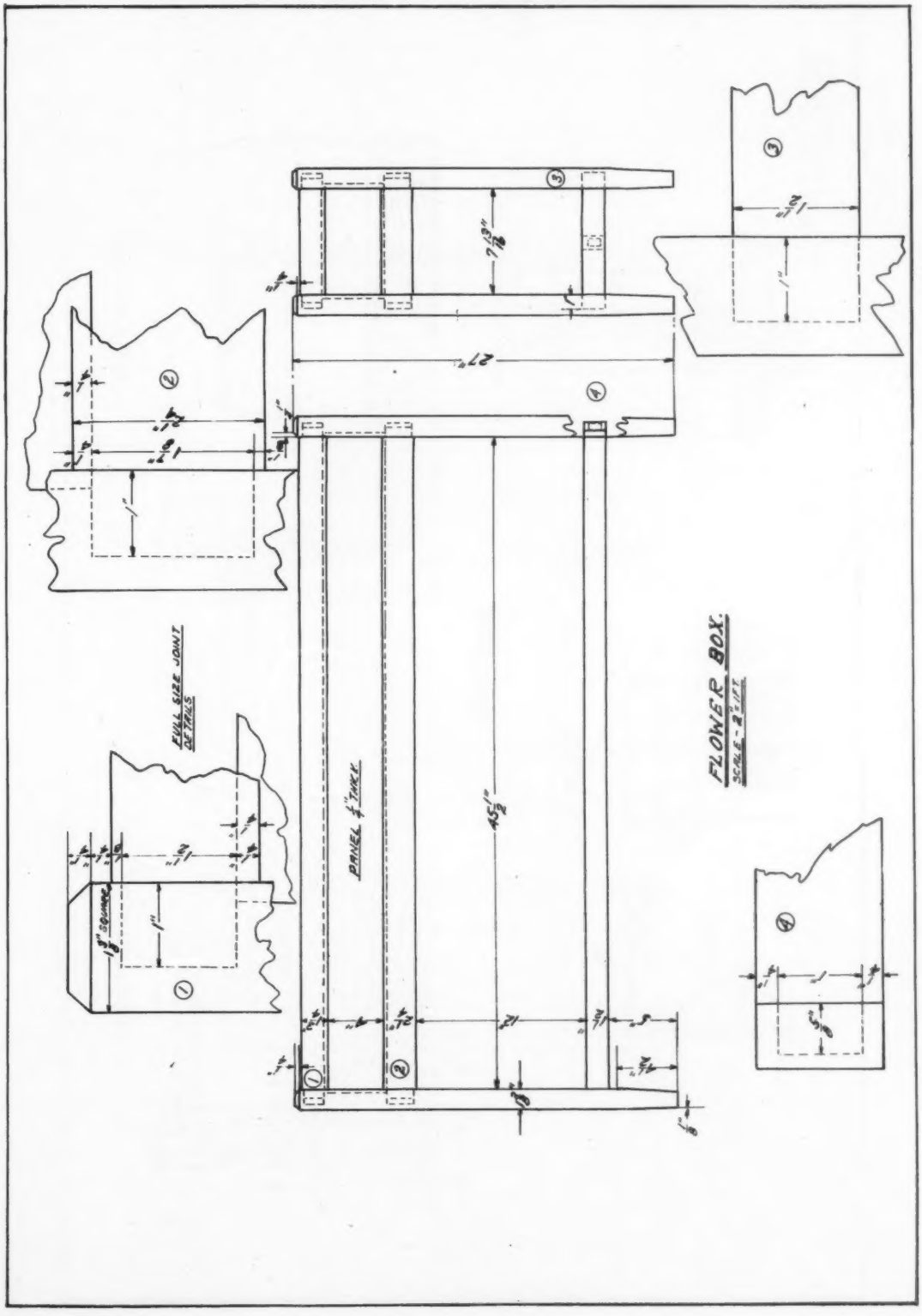
FLOWER BOX.

F. W. Ziegenhagen, Instructor in Woodwork, Boys' Technical High School, Milwaukee, Wis.

The flower box shown in the drawing is a problem that an average student in high school manual training can successfully make.

Instead of using $\frac{1}{4}$" panel, a solid panel may be used cutting the tongue on the rip saw.

In detail No. 1, care must be taken in placing the mortise low enough to avoid forcing the wood at the end of the post. There are several ways to place the pots of flowers in the box. One scheme is to lay strips which rest on cleats fastened to the middle rail, and the



pots to be placed on the strips. A better plan is to place a zinc box on the strips.

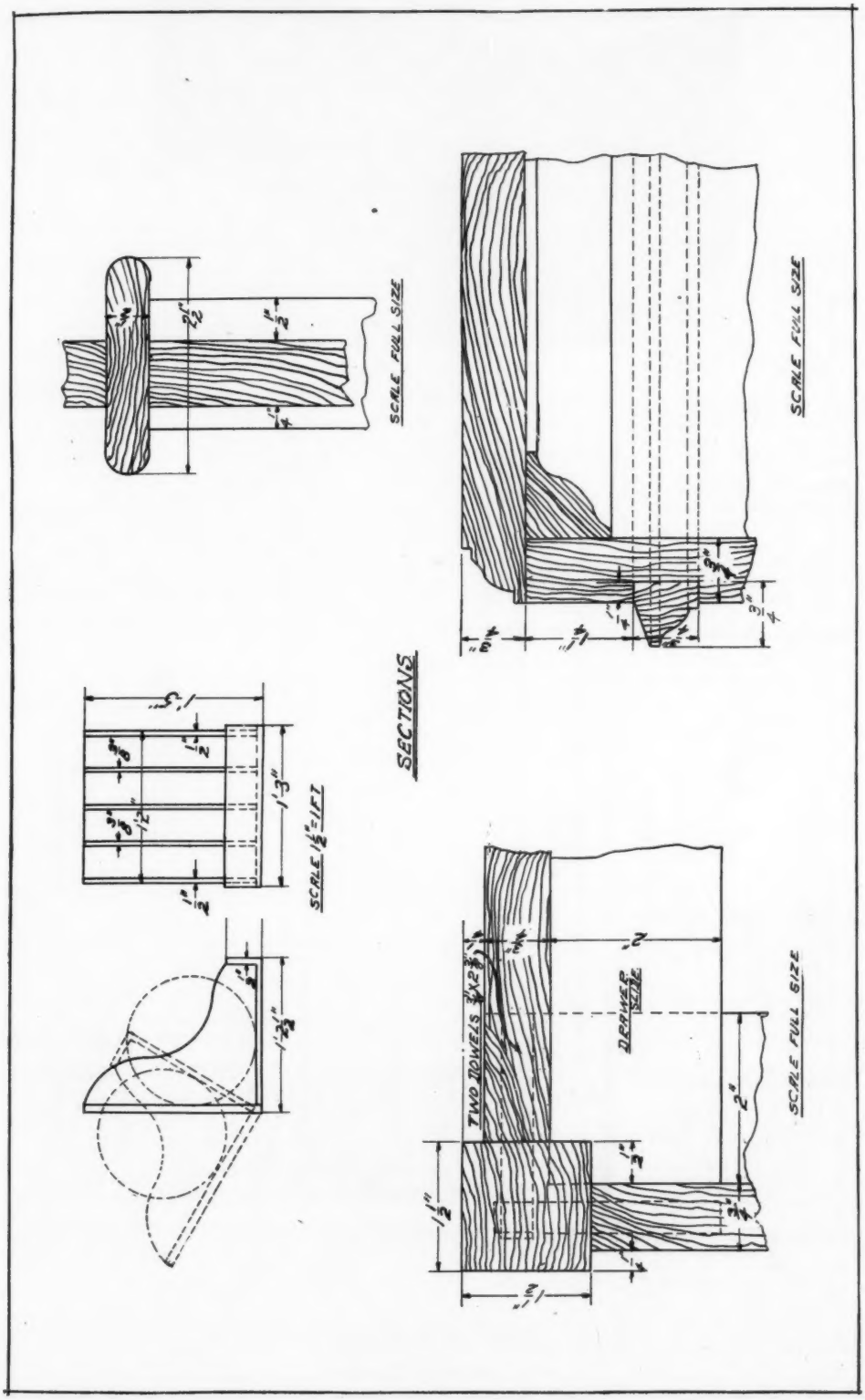
VICTROLA CABINET.

F. W. Ziegenhagen, Instructor in Woodwork, Boys' Technical High School, Milwaukee, Wis.

The victrola cabinet shown in the accompanying drawing is an interesting problem for boys working at cabinet making.

The first step is to obtain a phonograph motor from one of the established manufacturers or dealers.

Care must be taken to adjust the dimensions according to the size of motor and sound box. This applies, however, only to the small door compartments.

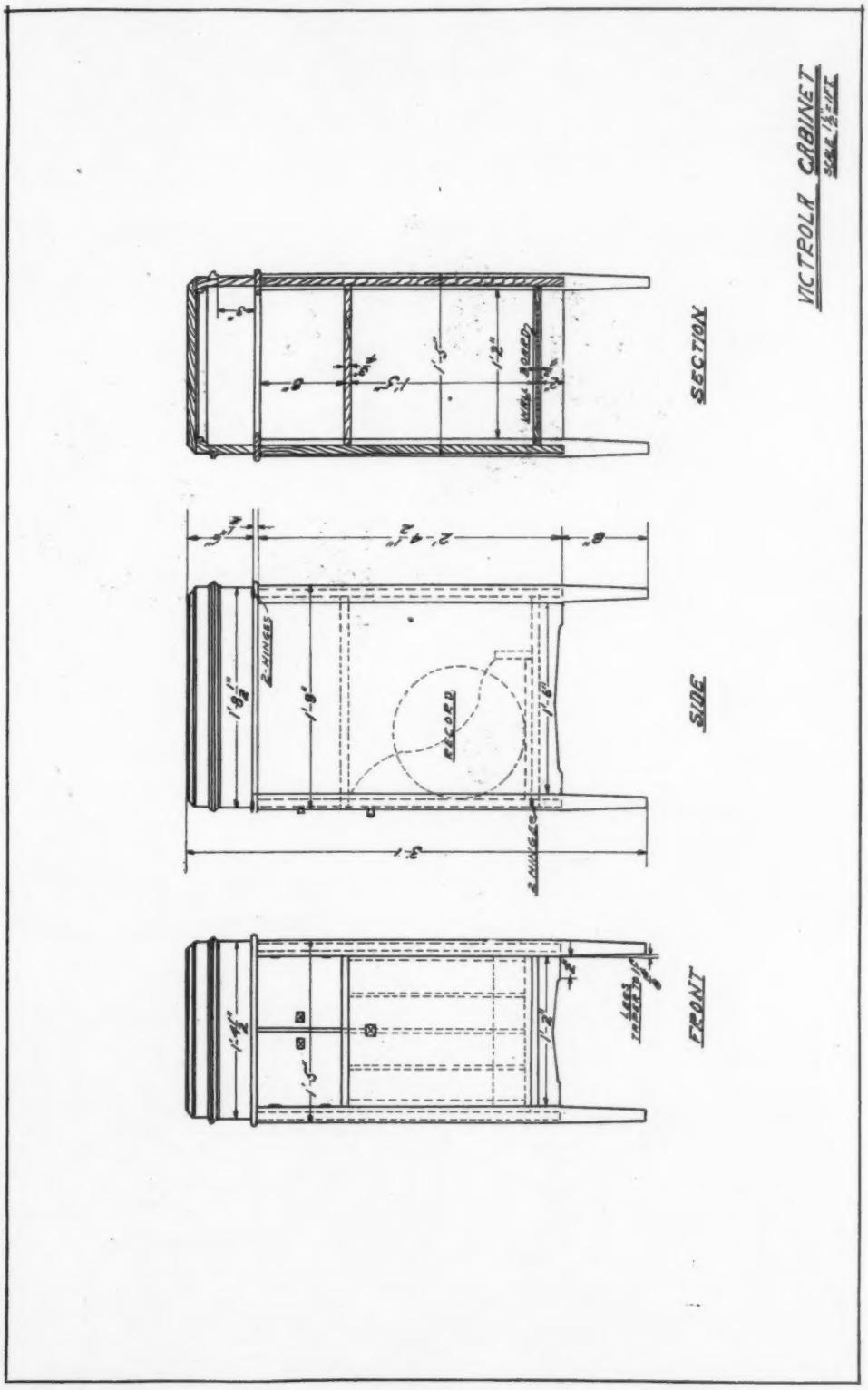


The sides and back may be solid or veneered panel. My suggestion would be to groove the sides and back into the legs instead of doweling, if solid panels are used. The doors, however, should be ¾" stock veneered on both sides.

The board to which the motor is attached is generally made 12" square. It is my experience that this is large enough for the average motor.

If the sound box is made by the students, spruce wood is recommended as this helps produce better tone quality.

The record holder in the lower section is shown in this case. However, if a student wishes to use the albums, the large door should be made into two doors



with two hinges fastened to the side of each leg. In this case a knob is not necessary as shown on the drawing.

The problem may be either made of quarter sawed white oak, or mahogany.

COATINGS THAT PREVENT END CHECKING.

Wood, whether in the form of logs, lumber, timber, shaped blanks, or veneer, will split and check at the ends during seasoning, if drying is allowed to go on at a natural rate thru the end grain. To retard the rate of drying from the ends, it is necessary to cover them with some protective coating.

The law of end coatings, in simple terms, is that the harder and greener the wood, the more effective must be the coating. In its experiments to determine the practicability of various coatings and end dips, the Forest Products Laboratory found the following to be true:

Paint is convenient to handle, but is of low effectiveness.

White lead is convenient to handle, and is of medium effectiveness.

Lorac, a commercial compound, is convenient to handle, and is of considerable effectiveness.

Rosin-lampblack is inconvenient to handle, but is of high effectiveness.

Rosin-lampblack is made according to the following formula:

Clear grade rosin..60 parts by weight
Lampblack ..... 1 part by weight

The rosin should be melted but not allowed to boil or froth. The lampblack should then be thoroly stirred in. The ends of the sticks should be dipped in this molten mixture to a distance of about one-half inch. When hard, the coating should be smooth, free from bubbles, shiny, and an eighth of an inch thick over the end.

If the stock is to be subjected to rough handling which might cause the coating to chip when cool, linseed oil may be added, in the proportion of 1 to 15 by weight, but this will have a tendency to make the coating excessively soft in the kiln at temperatures above 130°F.

MOISTURE ABSORPTION THRU VARNISH SAME FOR DIFFERENT SPECIES OF WOOD.

In experiments made by the Forest Products Laboratory, it was found that varnishes do not entirely prevent the transmission of moisture into wood but merely retard it, and that apparently there is no difference in moisture absorption thru the coating due to the species of wood used.

The panels used in the experiments were of yellow birch, basswood, red gum, African mahogany, white ash, white pine, Sitka spruce, southern yellow pine, bald cypress, incense cedar, white oak, western yellow pine, Port Orford cedar, and sugar pine.

Three coats of high-grade spar varnish were applied to 4 panels of each species. Two panels of each species were brush-coated and 2 were dipped by a special dipping machine designed to secure an even coating. The panels were allowed to dry 72 hours between coats and 10 days after the final coat before they were given the moisture-resistance test.

The moisture-resistance test consisted in exposing the panels for 17 days to a humidity of 95-100 per cent, or in an atmosphere practically saturated with moisture.

At the end of this test, it was found that all the brush-coated panels had absorbed between 5 and 6.5 grams of moisture per square foot of surface, and the dipped panels between 4 and 5 grams. Such variations in amount of absorption as appeared could easily have been due to inequalities in the application of the varnish. It was quite noticeable that the dipping process produced a more moisture-resistant coating than brushing.

BASKETS MADE IN THE CLASSES OF MISS JESSIE MORGAN, HELENA, MONT.

MR. WINSLOW RESIGNS.

Mr. Charles H. Winslow, director of research for the Federal Board for Vocational Education, resigned on September 30.

In making public his resignation, Mr. Winslow issued a statement criticizing the work of rehabilitation for disabled soldiers and sailors.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Shellacs and Varnishes.

962. Q:—(1) How is black shellac prepared and what is its use? (2) Can enamel be prepared by mixing varnish or shellac into paint? (3) How are stained varnish and shellac prepared?—A. M.

Ans. (1) Black shellac is prepared by adding dry ivory black to stock shellac reduced about one-half with alcohol. The proper amount of ivory black dry is bulk for bulk by volume and not by weight. It finds its use principally as a quick coating material for wooden patterns calling for gray iron castings in the foundry and for giving a quick and brilliant black finish to machine castings after they have been heavily coated with rough stuff. I find that this is a quick and really good method of brightening up all black work on shop machines, since it may be quickly renewed from time to time and when dusted off and wiped with an oil waste gives a really splendid appearance to a roomful of machines.

(2) Enamel of a sort may be prepared by mixing high grade varnishes with paint; shellac however may not be used for this purpose. It is far better to buy a high grade enamel like Pratt & Lambert's Vitralite which may be tinted with color ground in japan to any shade desired, than it is to bother with the very uncertain qualities of homemade mixtures for which I could readily give you directions but which thru lack of trade experience would mean little or nothing to you in judging the finished product. The production of enamel is a highly technical process since very pale varnishes especially selected for this work must be used together with pigments of even more careful selection. The process of grinding alone may produce a very fine or very poor product depending upon the care with which the rolls are cooled and the technical knowledge of the operator. It is therefore very unwise to attempt to make hand made enamel.

(3) So-called varnish stains are made by adding oil soluble colors to varnish and alcohol soluble anilines to shellac. Refer to Page 213 of the June issue of the Magazine. These are readily prepared in any shade by melting the oil soluble colors over a water or sand bath, stirring in the varnish and then carefully straining the resulting material thru muslin. For instance Pratt & Lambert No. 61 varnish can be purchased in eight colors, made simply by adding one to four ounces color per gallon of clear varnish. It is always a wise precaution to use a coat of clear varnish over these color varnishes in order to protect the color and in the case of furniture the clothes of those who may use chairs. Colored shellac is made by dissolving the different anilines at the rate of four ounces per gallon of alcohol and then using this to reduce the stock shellac. This material finds its use principally as a shading material under varnish in order to tone up sap streaks and other off shade spots. It should never be applied other than as a very thin wash coat.—R. G. W.

Miscellaneous Textbooks.

966. Q:—Please give me a list of books on electric wiring, concrete work and carpentry.—*J. W. D.*

A:—*Zerbe's Electricity for Boys*, New York Book Co.; *Thompson's Elementary Lessons in Electricity*, Macmillan Co., *New York, Chicago;* Schaefer's Beginning Electricity, $1, Harper Bros., New York; *Poppe's House Wiring*, $0.50, N. W. Henley Co., New York; *Werwath's First Principles of Electricity*, $1, Electroforce Publishing Co., Milwaukee, Wis.; *Sharp's Practical Wiring*, $1, D. Appleton Co., New York, Chicago; *Hawkins'* Electrical Guide No. 3, Theo. Audel Co., New York; *Weber's Electrical Construction*, $1.25, Manual Arts Press, Peoria.

Campbell's Concrete on the Farm and in the Shop, $0.75, N. W. Henley Publ. Co., New York; *Henry's Practical Concrete Work*, $0.50, Concrete Publ. Co., Detroit, Mich.; *Manual Training Course in Concrete*, $0.25. Association of Portland Cement Manufacturers, Chicago; *Campbell and Beyer's Practical Concrete Work*, $1.50, published by the authors, at Oak Park, Ill.; *Fallon's How to Make Concrete Garden Furniture*, $1.50, McBride & Co., New York.

Roehl's Problems in Carpentry, $1, Webb Publishing Co., St. Paul, Minn.; *Kilbon's Carpentry for Boys*, $0.75, Lothrop, Lee & Shepard, Boston; *King's Carpentry and Woodwork Series*, American Book Co., New York, Chicago; *Van Deusen's House Planning*, $0.25, Manual Arts Press, Peoria; *Hall's Carpentry and Mechanics for Boys*, $2, Lothrop, Lee & Shepard, Boston; *Moore's How to Build a Home*, $1, Doubleday, Page & Co., Garden City, N. Y.; *King's Constructive Carpentry*, American Book Co., Chicago, *Griffith's Carpentry*, Manual Arts Press, Peoria.

Industrial Mathematics for the Trades.

967. Q:—Please suggest books on the teaching of mathematics as applied to machine shop work, printing, electricity and automobile engineering.—*S. H. L.*

A:—*Colvin's Machine Shop Calculations*, $1, McGraw-Hill Co., New York; *Holton's Shop Mathematics*, $1.25, Taylor-Holden Co., Springfield, Mass.; *Burnham's Mathematics for Machinists*, $1.25, John Wiley, New York; *Blake's Mathematics of Machine Design*, $0.25, Industrial Press, New York; *Colvin and Cheney's Machine Shop Arithmetic*, $0.50, N. W. Henley Publ. Co., New York; *Breckenridge, Mesereau and Moore's Shop Problems in Mathematics*, $1, Ginn & Co., Boston; *Oberg's Shop Arithmetic for the Machinist*, $0.25, Industrial Press, New York; *Norris' Shop Mathematics*, $1.50, McGraw-Hill Co., New York; *Davis' How to Find Costs in Printing*, $1.50, Oswald Publ. Co., New York; *Vickers'. How to Estimate in Printing*. $0.50, Oswald Publ. Co., New York; *Woodfield's Printer's Arithmetic*, $0.60, Chicago Typothetae School of Printing; *Basford's How to Estimate in Printing*, $1.50, Oswald Publ. Co., New York; *Weber's Problems in Electrical Construction*, $1.25, Manual Arts Press, Peoria; *Hobbs' Arithmetic of Electrical Measurements*, $0.50, D. Van Nostrand Co., New York; *Burns and Branch's Practical Mathematics for the Engineer and Electrician*, $1, J. G. Branch Publ. Co., Chicago; *Whittaker's Arithmetic of Electrical Engineering*, $0.65, Macmillan Co., New York; *Koch's Mathematics of Applied Electricity*, $3, John Wiley & Sons, New York; *Hudsons' Engineers' Manual*, $2, John Wiley & Sons, New York.

Spiral Turning.

972. Q:—Can spiral turning be done on an ordinary wood turning lathe? If so, can you recommend any books or magazine articles on the subject?—*G. H. R.*

A:—Spiral turning can be done very easily on an ordinary wood turning lathe, such as is used in the average school shop.

The process of doing spiral turning is described very accurately and completely in Milton & Wohler's "Course in Wood Turning", Bruce Publishing Company.

Designs for candle-sticks, reading lamps and piano lamps will be found in *Milton & Wohler's Course in Wood Turning*, Bruce Publishing Company; *Ross's Wood Turning*, Ginn; *Selden's Elementary Turning*, Maudslay Press, Valley City, N. D.

Reviving Oxidized Varnish.

965. Q:—I have some varnish that after a year turned thick, in fact most of the varnish does this after it has been opened. Now what can I do with it to make it usable? I have tried turpentine without any results.—*H. J. M.*

It is suggested that when a gallon of fresh varnish is opened that it should not be left in the can but poured into pint Mason or E. Z. seal jars and sealed until ready to use. These jars may be cleaned readily with turpentine or may be boiled in a strong solution of Gold Dust and after a thoro washing and drying ready for further use. In the case of partly oxidized or thickened varnish it is best to carefully break the skin on the surface, pour out the varnish beneath into a clean pan or similar vessel and add one-fifth volume pure turpentine, stir in thoroly and heat almost to the boiling point over a water or sand bath. Do not leave on any longer than necessary, otherwise the reducer will be lost thru evaporation and the increased possibility of having the mixture flash. To every pint of this mixture add when in a luke warm condition, one teaspoonful of dark japan drier, stir in carefully, put in jars and seal for future use. This varnish should age at least a month before using in order that the turpentine and drier may be thoroly incorporated. If it seem desirable

the varnish may be screened thru a piece of old silk or similar close woven cloth before bottling. It is further suggested that supervisors and manual training men in general purchase their varnish stock in pint or quart cans, since the additional cost of five or more cents for a small can is more than offset by the amount of costly material saved thru the use of small cans.—*R. G. Waring.*

Binding Texts.

974. Q:—Can you give me a list of books on bookbinding?—*G. L.*

A:—*Bean's Bookbinding for Beginners*, School Arts Publishing Company, Boston; *Cockerell's Bookbinding and the Care of Books*, $1.50, Manual Arts Press, Peoria; *Vaughn's Bookbinding and Printing*, $1, Public School Publishing Co., Bloomington, Ill.; *Pleger's Bookbinding and Its Auxiliary Branches*, Inland Printer, New York, Chicago; *Hasluck's Bookbinding*, $0.50, Inland Printer, New York, Chicago; *Zaehnsdorf's Art of Bookbinding*, $1.60, Inland Printer, New York, Chicago; *Crane's Bookbinding for Amateurs*, $1.10, Inland Printer, New York, Chicago; *Halliday's Bookbinding as a Handwork Subject*, $1, E. P. Dutton Co., New York; *Adam's Practical Bookbinding*, $2.50, Munn & Co., New York.

NEW BOOKS

Progressive Steps in Architectural Drawing.

By Geo. W. Seaman. Cloth, 63 pages. The Manual Arts Press, Peoria, Ill.

Architectural drawing has not progressed as a high school subject because the principles of teaching it have not been worked out. The methods have taken into account neither the age of the students nor the purpose of the study. The situation may be expressed by saying that the courses have sought to teach the most advanced rhetoric of a graphic language when the students were ready only to acquire a very limited vocabulary and a few elementary grammatical facts of that language.

The present book should do much to popularize the study of architectural drawing. It is a very simple, brief text and its greatest value is in the simplicity of its method. It limits itself in scope to the elements of drawing plans for houses and outlines a definite system of draftsmanship recognized for its logic by wide use in architectural offices. The student progresses from the simple preliminary sketches which architects use, to draw floor plans and later elevations and finally ordinary details of construction. All such topics as perspective, rendering, specifications, plumbing, heating, etc., are omitted—or better, the book stops short of them. The final group of four plates illustrate the Roman orders in simple teachable form. Two plates of lettering in the form of suggestions on architectural lettering are appended.

Farm Woodwork.

By Louis M. Roehl. Cloth, crown octavo, 136 pages. Price, $1.25, net. The Bruce Publishing Co., Milwaukee, Wis.

This book parallels the author's earlier collection of "Agricultural Woodworking" problems and presents a wide variety of practical, usable articles which can be made in the school shop for use in the farm-yard, the barn, the house and the orchard. Each problem is presented in the form of working drawing and bill of materials and sufficient information concerning the construction to insure success in overcoming difficult points. Supplementary information which the boy and the teacher constantly require in the school and farm shop is added. The book fulfills the requirements of the Smith-Hughes law for productive work in agriculture. It is fully illustrated and well printed.

Exercises in Lettering—Vertical Gothic.

By Geo. G. Greene. Paper, 2½x5¼, 32 pages. The Bruce Publishing Co., Milwaukee, Wis.

This addition to Mr. Greene's series of vest pocket booklets will be welcomed by teachers who prefer vertical to slant gothic lettering for their mechanical drawing classes. The same effective arrangement of the former booklet is used. An alphabet chart for the student's drawings is included and exercise blocks are available.

Higher Arithmetic.

By George Wentworth and David Eugene Smith. Cloth, 250 pages. Price, $1. Ginn & Co., Boston.

This book is intended for normal schools and advanced classes in high schools where a thoro review of arithmetical principles and methods are necessary for general and vocational purposes. Principles rather than drill are emphasized and practical applications are made by means of problems in banking, merchandizing, etc., such as adults commonly deal with in professional and commercial life. While the whole work is of the most advanced and difficult type, it is notable that the ridiculous type of "hard examples" of the old-time arithmetics is entirely absent. Some algebraic principles are introduced, short cuts are emphasized, and logarithms and the slide rule are introduced as supplementary work.

First Lessons in Business.

By J. A. Bexell. Cloth, octavo, 174 pages. J. B. Lippincott Co., Philadelphia, Pa.

This is the first volume of a series of textbooks on Thrift to be edited by Mr. Arthur Chamberlain, chairman of the N. E. A. Committee on Thrift. The book presents the elements of business practice. It emphasizes the personal qualities which the businessman must possess and adds those elementary facts of methods and routine which are necessarily a part of every boy's and girl's equipment for life.

The Redemption of the Disabled.

By Garrard Harris. Cloth, xxvi and 318 pages; illustrated. Price $2.00 net. D. Appleton & Company, New York, London.

This book is a comprehensive account of the program which the United States government is working out for the physical and vocational rehabilitation of soldiers and sailors who were disabled during the late war. It is general and nontechnical in character and constitutes an interesting, optimistic non-critical chronicle of the program as outlined and developed up to the present time.

The book opens with a foreword by Chas. A. Prosser and an introductory chapter on the physical reconstruction work of the U. S. Surgeons Office, by Dr. Frank K. Billings. The first section devotes three chapters to the need of reconstruction and the duty of the nation; the second section of nine chapters describes the origin and characteristics of the reconstruction work by the allied nations and the central empires; and, the fourth section takes up in twelve chapters the details of the American work. Two final chapters discuss the problem of industrial rehabilitation of men injured in shops and factories, and the relation of the states to the federal program.

To anyone who is interested in the general problem the book will be a welcome source of information. The stuff which has appeared in the magazines has taken up only small spectacular phases of the whole program or has been propaganda. Here the author describes the entire process from the battle field to the soldier's final placement in industry and discusses the reasons for the plans adopted.

The book naturally fails to give any figures as to the amount of the rehabilitation work now in progress, to tell of the cost of instruction and administration or to forecast the ultimate results. It will be two years before any such aspects of rehabilitation can be discussed and evaluated.

Lessons From the War and Their Application in the Training of Teachers. By Wm. T. Bawden, specialist in industrial education of the Bureau of Education. Industrial Education Circular No. 1, Jan., 1919, of the Bureau of Education, Washington, D. C. This pamphlet represents a report of a conference of men from institutions in the Mississippi Valley engaged in training teachers of the manual arts and industrial education. The study takes up the subjects of practice teaching, development of teacher-training courses in trades and industries, and the examination and certification of teachers.

Training courses in Safety and Hygiene in the Building Trades. By J. H. Gill, special research agent of the Federal Board of Vocational Education. Trade and Industrial Series No. 6, Bulletin No. 31, 1919. Issued by the Federal Board at Washington, D. C. The pamphlet takes up accidents, infections, dangers in the demolition of structures, excavations, blasting activities, hoisting, storing of building materials, use of scaffolding, miscellaneous hazards, and emergency provisions.

Wisconsin Laws Relating to Vocational Education. Bulletin No. 3 of the Wisconsin Board of Vocational Education, Madison. The pamphlet discusses the organization and functions of the state board, qualifications of teachers and courses of study, child labor permits and apprenticeship.

Artistic Industries in Community Life and Americanization. This booklet describes the help given by the Art Alliance of America to the development of foreign handicrafts in New York City. Suggestions for similar movements in other cities are given. The booklet is handsomely illustrated with photographs of an exhibit of European art craftwork.